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ABSTRACT

The characteristics of effective or successful individualized instructional programs were investigated. The work of other evaluators was reviewed and a series of screening criteria were applied in order to identify effective programs. Programs were selected from evaluation reports for their effectiveness and their "popularity." Information about these programs was then obtained, coded, and used to analyze and synthesize findings. On both theoretical and operational levels, successful programs, including written instructional objectives, frequent diagnosis of student learning needs, provision of instruction five times per successful programs, including written instructional objectives, frequent diagnosis of student learning needs, provision of instruction five times per week, self-pacing, the use of a variety of instructional materials, small group or independent study, and small class size. Some instructional features often considered necessary for individualization were not found to be essential, such as small class size, certain grouping patterns, or written individual plans. Assessment procedures were generally commercial, norm-referenced, standardized achievement tests. No highly informative literature was found on the appropriateness of standardized tests or criterion referenced tests for the evaluation of individualized programs. Descriptions of eleven evaluation reports, a list of successful programs, data collection sheets, and a number of tables are appended. (Author/BW)

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A STUDY OF THE CHARACTERISTICS OF EFFECTIVE INDIVIDUALIZED INSTRUCTION PROGRAMS

Calvin E. Wright and Yungho Kim

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C. E. W.

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INTRODUCTION

Purpose

Public Law 93-380, the Education Amendments of 1974, contains a provision for a study of compensatory education designed and conducted by the National Institute of Education (NIE). Portions of the multifaceted study are directed toward an analysis of the effectiveness of methods and procedures for meeting the educational needs of children, including the use of individualized written educational plans. The study described in this report was undertaken as one part of the overall effort. The main purpose of this study was to identify the characteristics of effective or successful individualized instruction programs, including both compensatory education programs and programs serving a broader student population. More specific objectives of the study were to compile and analyze available information to provide answers to the following questions:

1. What are the major definitions of the term "individualized instruction" in the literature, and how do they differ?
2. What program elements or variables appear to be characteristic of successful or effective individualized instruction programs?
3. How do successful or effective individualized instruction programs cluster in terms of theoretical models or empirical groups?
4. How appropriate are the various assessment instruments used to measure the effectiveness of individualized instruction programs?

Approach

The general approach used for this study called for reviewing the work of other evaluators and applying a series of screening criteria in order to identify effective or successful programs of individualized instruction. Evaluation reports on program effectiveness were first identified and reviewed for appropriateness on the basis of a set of criteria. A second set of criteria were then used to select individualized instruction programs from among those programs identified as successful in the evaluation reports. Certain "popular" programs of individualized instruction not identified from the evaluation reports were also selected on the basis of a third set of criteria. Information about the successful programs was then obtained, coded,

and used to analyze and synthesize findings. Reviews of the literature were made as necessary. The procedures used in this study are discussed in greater detail in the Method section.

Some Background on Individualized Instruction

An extensive review of the literature on individualized instruction is outside the scope of this report. However, a brief review of the background on individualized instruction seems useful, especially since it relates to establishing criteria for individualized instruction, as described in the Method section below. It also relates to a later discussion of attempts to classify and group effective individualized programs. Hence, this section summarizes developmental efforts in individualized instruction, definitions of individualized instruction, and schemes for classifying individual instruction.

Developmental Efforts in Individualized Instruction

The adaptation of instruction to individual differences has been one of the major concerns of all the great educators in the past, such as Socrates, Quintilian, Comenius, and John Dewey. For instance, John Dewey established his Laboratory School in 1896, which was a pioneer effort to individualize instruction in the classroom. In this laboratory, students were allowed to pursue different educational goals and to engage in different learning activities of their own choosing (Saettler, 1968). The most widely publicized of all early attempts to individualize instruction in the classroom was Washburne's Winnetka Plan in the 1920's (Washburne & Marland, 1963). The Winnetka Plan allowed students to study the intended content on their own, and at their own pace. Here emphasis was placed on self-study and self-pacing.

At the same time that Washburne was developing the Winnetka Plan, Helen Parkhurst developed the Dalton Laboratory Plan. As Wingo (1960) described the program, the Dalton Plan allowed students to work with alternative materials, was self-pacing, and placed responsibility on the students for self-management of their own progress.

Contemporary efforts at individualizing instruction are represented by IPI (Individually Prescribed Instruction) and PLAN (Program for Learning in Accordance with Needs). Both IPI and PLAN are examples of the systems approach applied to education. However, their emphases are somewhat different. IPI, originated by Robert Glaser at the University of Pittsburgh, places its emphasis on allowing students to work independently at their own rates with self-study

materials (Bolvin & Glaser, 1968). PLAN, originated by John Flanagan at the American Institutes for Research, places its emphasis on alternative learning materials (different Teaching-Learning Units for the same objectives) and student participation in the determination of goals and learning materials (Flanagan, 1970).

In summary, even though the purpose of all of the developmental efforts in individualized instruction was to meet more effectively the educational needs of individuals, their emphases were placed on different aspects of individualization. Some programs were most concerned with providing alternative goals, while others were concerned with differential treatment and individual pacing. Also, for some programs, the main concern was providing for self-determination and self-management in the instructional process.

Definitions of Individualized Instruction

It is not surprising that there are many different definitions of individualized instruction, because there are many varieties of individualized programs and "individualization" means different things to different people. There are, however, several definitions which are generic and succinct. For instance, the Committee for Economic Development (1968) defined individualized instruction as "instruction that is designed for the individual student rather than for an entire class." Cooley and Glaser (1969) defined individualized instruction as "the adaption of instructional practices to individual requirements." Weisgerber (1972) defined individualization as "tailoring of the educational process which takes into account the unique qualities and needs of each individual." The problem with these definitions is that they are too general to be useful for practical purposes.

Several authors attempted to define individualization in terms of the ways instruction can be individualized. For instance, Wilhelms (1962) suggested three ways to individualize: (a) through rate of progress; (b) through content; and (c) through curriculum organization, such as using flexible units of instruction. Shiman, Culver, and Lieberman (1974) described their efforts to individualize instruction through: (a) rate of learning; (b) differentiation of curriculum offerings; (c) variety of choice in learning activities; and (d) learner self-determination of objectives. Howes (1970) suggested three modes of individualization: (a) adjusted instruction through organizational changes and grouping practices; (b) differential instruction according to rate of

learning, achievement level, or interest; and (c) focus in independence and self-direction. He considered individualized instruction as a way of thinking about the teaching-learning process, rather than as a group of programs with particular characteristics. Gibbons (1971) presented a similar view. He argued that the term "individualized instruction" is used to refer to such a variety of instructional programs that it has little meaning. He suggested that individualized instruction is a liberal movement in education, rather than a specific program or kind of program. Perhaps this is one reason why several authors of recent books on individualized instruction did not even attempt to define it (Bishop, 1971; Karlin & Berger, 1974; Musgrave, 1975).

There have been several attempts to define individualized instruction in terms of its operational characteristics. For instance, Southworth (1971) defined individualized instruction as "planning and conducting, with each pupil, programs of study and day by day lessons that are tailor-made to suit his learning requirements and his characteristics as a learner." The National Center for Educational Statistics (USDHEW, 1970) defined individualized instruction as "a program of instruction whereby a curriculum is planned for each student based upon a diagnosis of his individual learning needs and interests, engages the student in determination of his learning goals and activities, draws from several disciplines as they are applicable to the attainment of his goals, and is individually paced." Cooley and Leinhardt (1975) said that instruction is individualized: to the extent to which it includes specific objectives, clear mechanisms for matching the student and the curriculum, and individual sequencing and pacing; and to the degree to which the instructional materials and teachers are responsive to individual learner needs.

In summary, there are many definitions of the term "individualized instruction." Some are generic, and some are operational. Some people define individualization in terms of the ways instruction can be individualized. Others define individualization in terms of its operational characteristics, such as having specific learning objectives, diagnostic procedures, and frequent progress checking. Since there are many ways of individualizing instruction and the operational characteristics of various individualized programs can vary greatly, it is not surprising that individualized instruction means different things to different people.

Schemes for Classifying Individualized Instruction

Several authors attempted to develop schemes for classifying individualized

programs or to identify types or patterns of individualization. Cronbach (1967) suggested three patterns of educational adaptation to individual differences in terms of educational goals and instructional treatment: (a) fixed educational goals and fixed instructional treatment; (b) options in educational goals and fixed instructional treatment within option; and (c) fixed educational goals within course or program and alternative instructional treatment. Edling (1972) classified various approaches to individualization into four types, all of which provide for individual pacing. They were: (a) "individually diagnosed and prescribed," wherein the school diagnoses and prescribes what the student will be taught, as well as the materials and methods to be used; (b) "self-directed," wherein the student chooses learning materials and methods but the school sets objectives; (c) "personalized," wherein the student sets the learning objectives and the school specifies the learning materials and methods to be used; and (d) "independent study," wherein the student chooses his own goals as well as the materials and methods for attaining them.

In his descriptive analysis of individualized instruction, Gibbons (1971) argued that individualized programs vary in the elements of instruction they individualize and in the degree of individualization in those elements. The 15 elements isolated were: percentage of the student body; percentage of the school day; attendance; materials for study; method by which the materials are to be studied; pace at which the materials are to be studied; activity that accompanies or follows study; decision making; teaching focus; teaching function; teaching method; environment; time structure; evaluation; and objectives or purposes. Using these 15 elements he plotted profiles for 10 selected individualized programs. The classification scheme proposed by Blaschke, Sweeney, and Curry (1975) takes basically the same approach as Gibbons. They argue that each program can be classified in a dichotomous (yes or no) manner on each of the following variables: performance objectives; continuous diagnosis/prescription; existence of alternative learning paths, and individual pacing. Based on four dichotomous variables, a 16-cell matrix can be constructed, each cell representing a different type of program. Some of these cells, then, represent individualized programs. Walberg (1975) presented a taxonomy of instructional models for individual learning. According to the taxonomy, there are three traditional models (selection, enrichment, and acceleration), two diagnostic models (hierarchical and random), a multimodal model (multiple courses of instruction but for the same goal), and a multivalent model (different goals for different students).

In summary, there have been several attempts to develop schemes for classifying individualized programs. The common variables used in the proposed schemes seem to be: the existence of alternative goals for different students; the availability of alternative instructional treatment for different students; individual pacing; and self-choice of goals and/or instructional treatment.

METHOD

This section addresses methods and procedures used in the identification of evaluation reports on program effectiveness, the selection of successful individualized instruction programs from evaluation reports, the identification of popular programs of individualized instruction, the coding of information about successful individualized programs, the final review of selected programs, and the analysis and synthesis of data.

Identification of Evaluation Reports on Program Effectiveness

The identification of evaluation reports on program effectiveness involved a manual search for sources and references, a computer search for reports on effectiveness, the development of criteria for evaluation report appropriateness, and a review of reports for appropriateness. In addition, descriptions were prepared for each evaluation report selected as appropriate. Each of these activities is discussed next in greater detail.

Manual Search for Sources and References

An extensive manual search was done in an attempt to identify evaluation reports on program effectiveness, or leads to such reports. Reports and documents available to the staff and at the Stanford University Libraries were reviewed, with special attention given to bibliographies. As reports or other publications were obtained, their references were reviewed for leads to yet additional reports. Some of the many publications reviewed include: the ALERT catalog (Henrie, 1972), the CEDar catalog, some issues of Education Daily, Education Recaps, Educational Marketer, Pacesetters in Innovation (USDHEW, undated-a), D & R Reports, and ERIC-TM News. In addition, over 45 organizations, agencies or individuals were contacted during the search to follow up or obtain leads to evaluation reports, or to find out about the contents of reports. A few leads could not be followed up since the organizations could not be located or were no longer in existence.

Computer Search for Reports on Effectiveness

Two complex (in terms of the number of descriptors and the search strategy) ERIC computer searches were conducted through the ERIC Clearinghouse on Information Resources, Stanford Center for Research and Development in Teaching, School of Education, Stanford University. The first search produced 102 references, but a review of the abstracts resulted in the identification of only 12

reports potentially appropriate to this study. The second search was run with a less restrictive set of descriptors. However, out of 562 references listed, only a few new items were obtained.

Criteria for Evaluation Report Appropriateness

Criteria were developed for use in determining whether an evaluation report was appropriate for the purposes of this study. The term "evaluation report" was interpreted broadly to include any report that described procedures used to identify effective or successful educational programs. The criteria were:

1. The evaluation study must have identified effective or successful educational programs from a larger number of programs on the basis of a set of explicit criteria developed by the evaluators.
2. The educational programs evaluated must have included, but not necessarily have been restricted to, programs in grades Kindergarten through 6 in the basic skills areas of reading and mathematics.
3. The evaluation study must have been completed since 1965.
4. Written descriptions of the selected programs must be included in the evaluation report or be readily available.

For the purposes of this study, a "program" was defined as a plan for using educational funds. It is an instructional system that was, or is, ongoing in a specific location or in specific locations. Whereas products are tangible and transportable educational materials which are basically self-contained, typically a program will have products that it uses, a staff, a budget, standard procedures, general goals and specific objectives, etc. That is, it has the characteristics of a system. (These definitions are based on an NIE report prepared by Klein and Schermer, 1975).

As developed, the criteria given above were appropriate for evaluation reports that used either of two general approaches. With the first approach evaluators identified a program as effective or successful if it met its own prespecified objectives or criteria. With the second, to be successful a program had to meet explicit criteria set up by the evaluator.

Review of Reports for Appropriateness

Copies of potentially appropriate evaluation reports were located and obtained as necessary. Approximately 90 reports were reviewed for appropriateness using the criteria noted above. There were an additional eight

that could not be reviewed since copies could not be located. Included in the review were reports on Follow-Through and performance contracting programs. Although many of the documents were useful for other purposes in that they contained descriptions of programs, only 11 reports were found that met the appropriateness criteria. The 11 reports found appropriate are: Hawkridge, Chalupsky, and Roberts (1968); Hawkridge, Campeau, DeWitt, and Trickett (1969); Epstein, Margosches, Schrader, and Walton (1971); Wargo, Campeau, and Tallmadge (1971); Crawford, Kratochvil, and Wright (1972); Gordon and Brownell (1972); Walton, Esser, Epstein, Margosches, and Schrader (1973); Foat (1974); Bowers, Campeau, and Roberts (1974); Far West Laboratory (1975) which reports programs approved by the Joint Dissemination Review Panel; and the Title III handbook for the validation of educational practices (USDHEW, undated-b).

Descriptions of Evaluation Reports

For each of the 11 evaluation reports found appropriate, a one- to two-page description was prepared. Serving as an annotation, each description contained five sections: (a) a general description noting for which organization or agency the study was done, the purpose or objective of the study, the number of programs reviewed and screened, and the number of successful programs identified; (b) a statement of the kinds or types of educational programs reviewed and their subject matter, where appropriate; (c) the target population served by the programs reviewed, including grade level and types of students using the programs; (d) a summary of the procedures used for identifying effective programs, including the initial selection of programs for review; and (e) a summary of the specific criteria used for selecting effective programs. The 11 descriptions that were prepared are given in Appendix A.

Selection of Successful Individualized Instruction Programs from Evaluation Reports

This section addresses criteria for selecting individualized programs from evaluation reports and the tentative selection of the programs.

Literature Review of Definitions of Individualized Instruction

A review of the literature was first undertaken to investigate the major definitions of the term "individualized instruction" and to look for ways of classifying individualized instruction programs. During the literature review, both "individualized instruction" and "individualized education" were covered, because these two terms are usually used interchangeably. However, it should

be noted that the term "individualized instruction" is more appropriately used to refer to those programs where instructional techniques and methodology are varied. The term "individualized education" is more appropriately used to refer to those programs where the curriculum itself (academic content or goals) is varied in addition to the instructional method and materials. Since a broad definition of individualized instruction was used in this study, there was no need for concern over which of the two terms specific authors used, or how they used it. Over 25 books, articles, and reports were reviewed. Although there were few formal definitions of individualized instruction, it was possible to find certain common elements from discussions of what individualized instruction should include.

Criteria for Selecting Individualized Programs from Evaluation Reports

Based in part on the literature review, criteria for the selection of individualized instruction programs were finalized. They were intended to be based upon a "broad" definition of individualized instruction, or upon multiple definitions in terms of the literature. The criteria were as follows:

1. The program must provide for student instruction in either reading or mathematics or both. That is, the program must be an instructional program for students, and the teaching of reading or mathematics or both must be a primary goal.
2. The instructional program must allow each student to pursue a formal or informal program or course of studies planned by, with, or for him on the basis of a diagnosis of his learning needs or requirements.
3. The instructional program must have been in use at one or more of grades Kindergarten through 6.
4. The instructional program must have demonstrated cognitive or affective benefits.
5. The program should not be classed as a bilingual program, or be targeted exclusively for physically or mentally handicapped children.

Criterion 1 was intended to exclude products, methods, techniques, systems, or practices not comprehensive or complete enough to be considered a "program" as defined above. For example, classroom management techniques were excluded, as were programs involving only training teachers how to individualize instruction. Also excluded as reading programs were programs involving solely

the teaching of reading readiness or the use of readiness materials.

Criterion 2 was based upon three notions arising out of the literature review that would appear to be basic requirements for a broad definition of instruction that is individualized in the basic skills areas of reading and mathematics for the grade levels considered by this study. They were: (a) a program of studies or instruction should be planned for each individual student; (b) each student's individual program of studies or instruction should be planned on the basis of someone's diagnosis of his or her learning needs or requirements; and (c) each student's program of studies or instruction should somehow be tailored to his or her learning needs or requirements. Without these three requirements, it is difficult to see how instruction can be individualized, for without them there is no emphasis on the individual student.

Criterion 3 assured that only programs intended for the grade range addressed by this study would be included.

Criterion 4 assured that only individualized instruction programs that produced demonstrated cognitive or affective benefits would be selected. Demonstrated cognitive or affective benefits must have been one of the objectives of an individualized program if the "success" criteria used by the authors of an evaluation report was that the program met its own objectives. The word "demonstrated" was used to assure that the cognitive or affective benefits were proven by evidence. The specific evidence varied from one evaluation report to another. For example, the Joint Dissemination Review Panel, in selecting the programs reported by the Far West Laboratory (FWL, 1975), considered whether gain shown by measures taken before and after the children experienced the program was large enough to be meaningful. The gain had to be large enough to be both statistically reliable (significant at or above the .05 level of confidence) and educationally significant (i.e., constituted meaningful improvement). Foat (1974) required evidence of educationally and statistically significant effects on achievement. Educational significance was defined as achievement gains at least one-third of a standard deviation greater than expectation, based on national norms or control group scores. The required statistical significance was no more than one chance in 20 (.05 level of confidence or above) that the observed gains could be due to chance. For Hawkridge et al. (1969), pupils had to achieve statistically significantly greater gains on standardized tests than had controls, or had to improve at a rate better than national norms.

Criterion 5 was used to exclude special purpose programs. A program was included, however, if it was targeted for "normal" children in addition to physically or mentally handicapped children.

Tentative Selection of Programs from Evaluation Reports

Using the criteria given above, successful individualized instruction programs were tentatively selected. The selection was tentative since it was often difficult to know from a short program description whether or not a program passed the criteria. Therefore, programs were sometimes selected tentatively until more information about them had been sought and reviewed. The number of programs selected from each of 11 evaluation reports found appropriate were: Hawkridge et al. (1968), three programs; Hawkridge et al. (1969), one program; Epstein et al. (1971), one program; Wargo et al. (1971), six programs; Crawford et al. (1972), seven programs; Gordon and Brownell (1972), five programs; Walton et al. (1973), two programs; Foat (1974), five programs; Bowers et al. (1974), four programs; Joint Dissemination Review Panel (Far West Laboratory, 1975), 45 programs; and USDHEW (undated-b), 44 programs. Although the number of individualized instruction programs selected from these 11 evaluation reports totaled 123, the count contained a number of duplicates since a program was often selected from more than one source. Not counting duplicates, 92 successful individualized instruction programs were tentatively selected.

Identification of Popular Programs of Individualized Instruction

In this study, two different routes were followed in an attempt to identify effective programs of individualized instruction. The first has been discussed above. Unfortunately, there was no assurance that this route identified all of the effective or successful programs of individualized instruction. Hence a second route was established whereby certain "popular" programs of individualized instruction were included in the study if they were not selected through the first route. Part of the reason for this alternate route was the assumption that, in this age of accountability, a given educational program would not be used year after year in a number of school districts if it had not demonstrated its effectiveness at least to the satisfaction of many of those who use it. Criteria for identifying popular programs were first developed, and then programs that tentatively met the criteria were searched for and identified.

Criteria for Identifying Popular Programs

A set of criteria was developed to guide the identification of popular programs of individualized instruction. They were:

1. The program must provide for student instruction in either reading or mathematics or both. That is, the program must be an instructional program for students, and the teaching of reading or mathematics or both must be a primary goal.
2. The instructional program must allow each student to pursue a formal or informal program or course of studies planned by, with, or for him on the basis of a diagnosis of his learning needs or requirements.
3. The instructional program must have been in use at one or more of grades Kindergarten through 6.
4. The program should not be classed as a bilingual program, or be targeted exclusively for physically or mentally handicapped children.
5. The program must have been in use for at least three years in at least five school districts.
6. The program must have been used by at least 3,000 students during 1975-76.
7. The program must have been used in at least three states during 1975-76.
8. Written descriptions of the program must be readily available.

The first three criteria noted above were the same as the first three for selecting individualized instruction programs from evaluation reports, and the fourth corresponds to the fifth. Criteria 5, 6, and 7 were included to attempt to assure that a selected program was "popular," and were used in lieu of a requirement that a program must have demonstrated cognitive or affective benefits. Criterion 8, that written descriptions of the program must be readily available, was comparable to criterion 4 for evaluation report appropriateness.

Search for and Tentative Identification of Popular Programs

A literature review was undertaken to supplement EERI staff and colleague knowledge of programs of individualized instruction that might meet the criteria for popular programs. The sources reviewed included recent books on individualized instruction (e.g., Atkinson & Wilson, 1969; Weisgerber, 1971; Gibbons, 1971; Mohan & Hull, 1974; and Talmage, 1975) and recent journal articles (such

as Hambleton, 1974). Special attention was given to bibliographies (e.g., Spitzer, 1968; Wade, 1968; and Sartain, 1970) and previous surveys (e.g., Pieronek, 1969; Aukerman, 1971; Edling, 1972; Henrie, 1972; and Briggs & Aronson, 1975). A report prepared for the NIE Compensatory Education Study (Blaschke, Sweeney, & Curry, 1975) was also useful. Follow-Through programs were considered (Edward J. Cherian & Associates, 1973), and CAI program directors recommended by staff from the National Science Foundation were also contacted.

Using the criteria, 28 popular programs of individualized instruction were tentatively identified pending the collection of additional information about them, especially extent of use.

Coding of Information About Successful Individualized Programs

This section addresses the development of data elements sheets, the use of the sheets, and the collection of information about successful programs.

Development of Data Elements Sheets

Data recording forms called "data elements sheets" were developed to record information about the selected individualized instruction programs. As a first step, planning and background documents were reviewed to identify potential questions that might be addressed by the study. The December, 1974, Research Plan, Compensatory Education Study was reviewed, as were portions of the hearings before the Committee on Education and Labor of the 93rd Congress on the Elementary and Secondary Amendments of 1973.

In designing the sheets, a number of factors were considered since the sheets were the key to the rest of the study. Included were: which elements of data would be needed to answer the questions to be addressed by the study and other potential questions; what type and how much information could reasonably be obtained from typical descriptions of educational programs; which characteristics of individualized instruction programs usually seem to be of interest or concern in the professional literature; and what information would be needed to illustrate the major definitions of the term "individualization of instruction." The data elements sheets went through a total of five versions, final revision having been made after tryout in actual use and further review. A copy of the data elements sheets is given in Appendix C, along with associated notes for its use. The notes contain definitions of many of the terms used in the sheets and in the Results section of this report.

Use of the Data Elements Sheets

When sufficient preliminary information was available about a selected individualized instruction program, data elements sheets were initiated for it. To assure consistency in completing the sheets, EERI staff members working on this task all completed data elements sheets independently for the same three programs. After the sheets for each program were completed, responses were reviewed, matters of interpretation were discussed and agreed to, and resolution procedures were developed.

For all data elements sheets, a two-step process was used. One staff member completed the data elements sheets for a program, and then all responses were independently verified by another member of the staff who reviewed the same program material. Any differences in response were then discussed until there was agreement. The EERI project director then reviewed and checked each of the sheets to determine whether any additional action was necessary, such as contacting program staff for more information. Similar procedures were followed when data elements sheets were updated after additional information about a program was obtained.

Collection of Information About Successful Programs

As previously noted the term "evaluation report" was interpreted broadly so that it included any report that described procedures used to identify effective or successful educational programs, whether or not the report itself contained descriptions of the programs. The broad interpretation was used so that the study would include programs approved by the USOE-NIE Joint Dissemination Review Panel (FWL, 1975) and those validated following procedures developed by USOE's ESEA Title III office (USDHEW, undated-b). This was done in part to assure that there would be a broad range of individualized instruction programs included in the study. Program descriptions were available from the Far West Laboratory for Educational Research and Development for most of the 45 individualized instruction programs approved by the JDRP. For the 44 programs selected from those validated by Title III procedures, only one or two paragraph descriptions were available. The National Advisory Council on Supplementary Centers and Services, which may have had more descriptive materials, was no longer in existence. Hence, information for most of the successful Title III programs had to be collected through direct contact with program staff or developers.

In addition to contacting the developers of programs for which little descriptive information was initially available, literature including catalogs, rejected evaluation reports, books (for the popular programs), and other documents were reviewed for descriptive information about the programs selected. As data elements sheets were completed, they were reviewed to see how much information was missing. A decision was then made as to whether the amount of information missing warranted a reasonable effort to obtain it, and specifically what effort should be made. At times, references to descriptive reports not previously identified were located as data element sheets were being completed. Altogether, over 65 letters were sent out to request information, and a large number of telephone calls were made. For all of the popular programs, the developers were contacted to request data necessary to verify that the programs met the selection criteria, even if descriptive information was not needed.

Final Review of Selected Individualized Instruction Programs

All data elements sheets were subjected to a final review to verify that they met the corresponding selection criteria. At the same time, identified duplicate programs were dropped. If a program had been selected as successful from an evaluation report and it was also identified as a popular program, the description from the former was used. If a program was selected from two or more evaluation reports and it was also identified as a popular program, the most site-specific description was used. That is, the description retained was the one that best described the operation of the program at a specific place and at a specific time.

As previously noted, 123 programs had been tentatively selected from evaluation reports, but since a program was often selected from more than one source, this represented 92 unique programs. Seventy-five of these 92 passed the final review. Six were dropped because written descriptions about them were not available, and six others were dropped since they failed to meet other criteria. Five additional programs were found to be duplicates.

Of the 28 tentatively identified popular programs, 13 passed the final review. Eleven were dropped since they were duplicates of programs selected from evaluation reports, while four did not meet the criteria. Hence, a total of 88 programs (75 from evaluation reports and 13 popular programs) passed the final review. They are listed in Appendix B. Some addressed reading, some mathematics, and some both. For the purpose of data analyses, however, those

individualized instruction programs that addressed reading and mathematics were treated as two programs. On this basis, there were 74 reading programs and 42 mathematics programs. The number of reading and mathematics programs selected from each source is given in Table D-1 in Appendix D.

Analysis and Synthesis of Data

The information on the data elements sheets was analyzed separately for reading and mathematics programs in order to describe the characteristics of effective individualized instruction programs in terms of individual variables. Separate analyses were also made for lower-grade programs and for upper-grade programs. A "lower-grade program" was a program intended for any one or more of grades Kindergarten, 1, 2, or 3, but not for any of grades 4, 5, or 6. Similarly, an "upper-grade program" was a program intended for any one or more of grades 4, 5, or 6, but not for any of grades Kindergarten, 1, 2, or 3.

To examine how the successful individualized instruction programs clustered in terms of theoretical models, the models were first identified by considering the major definitions of the term "individualized instruction," the purposes of representative developmental efforts in individualizing instruction, and various schemes proposed for classifying individualized programs. From the literature review, elements or variables common to most discussions of individualized instruction were identified. Theoretical models of individualized instruction were developed on the basis of these elements. An attempt was then made to classify the effective programs of individualized instruction in terms of the theoretical models. An attempt was also made to empirically group the effective programs of individualized instruction, first on the basis of 15 selected dichotomous variables, then based on nine variables.

RESULTS

The results of this study are discussed in three main sections. In the first, the characteristics of the effective individualized instruction programs are presented. Since that section ends with results related to program evaluation, the next major section addresses issues concerning the use of various types of achievement tests in the evaluation of individualized programs. The third major section reports on attempts to classify and group the effective individualized programs.

Characteristics of Effective Individualized Programs

The information on the data elements sheets was analyzed in order to describe the characteristics of the effective individualized reading and mathematics programs that were selected. The results are presented below in six sections: general characteristics; characteristics of objectives; diagnostic and prescriptive procedures; instructional procedures and materials; learner evaluation and assessment procedures; and program evaluation. If there were any notable differences between lower-grade programs (grades K to 3) and upper-grade programs (grades 4 to 6) in certain characteristics or if they appeared to differ from all reading or mathematics programs, the differences are mentioned. There were 21 lower-grade reading programs, eight upper-grade reading programs, 13 lower-grade mathematics programs, and five upper-grade mathematics programs.

General Characteristics

This section includes descriptive information on the general characteristics of the 74 reading programs and 42 mathematics programs, such as source of funding, year program came into use, and grade level intended for.

Year program came into use. Some of the reading programs came into use before 1966, but most of the reading programs (87%) and mathematics programs (95%) came into use between 1966 and 1972. Table D-2 in Appendix D shows the frequencies and percents of the programs by the year in which they came into use. Also, the table shows the same data in terms of the lower- and upper-grade programs. Most of the upper-grade mathematics programs came into use since 1971.

Original program developers. Table D-3 shows the frequencies and percents of the programs by type of developer. Most often the programs were developed by school, district, or program staff (77% of the reading programs and 64%

of the mathematics programs). The remaining programs were developed about equally by university or R & D Center staff and by commercial organizations. All the upper-grade mathematics programs were developed by school, district, or program staff.

Source of funds. The most frequent funding source for original program development was the federal government (72% of the reading programs and 64% of the mathematics programs). The second most frequent funding source for reading programs was the school district (7%), while for mathematics programs it was private funds and federal and state funds combined (both 12%). A few programs were developed with state funds. Likewise, the most frequent funding source for program operation was the federal government (64% for reading programs and 52% for mathematics programs). The next most frequent funding sources for program operation were federal and district funds combined, district funds, and federal and state funds combined. More detailed information on funding sources is given in Tables D-4 and D-5. These results should be interpreted cautiously since four of the evaluation studies from which the successful individualized programs were selected considered federally supported programs only.

Costs for program operation. It was hoped that data on per pupil costs for program start-up and yearly operation could be obtained. However, this information was available for only a small number of programs (about 30%), and the basis on which cost computations were made varied for different programs. For instance, some programs included regular teachers' salaries, while other programs included only those salaries paid from federal funds. Even though some cost figures were available for most of the programs, it was decided not to analyze the data because it will be definitely misleading rather than informative.

Subject matter addressed. Table D-6 shows the subject matter areas addressed by the selected programs. It should be noted that the reading or mathematics programs per se did not address other subject areas. The data simply indicate that some instructional programs selected as effective individualized programs happened to have more than just reading or mathematics components in them.

Among the 74 instructional programs which had an effective individualized reading component, 23 programs (31%) also had a language arts component while

25 programs (34%) also had a mathematics component. Among the 42 instructional programs which had an effective individualized mathematics component, 25 programs (60%) also had a reading component, and 16 programs (38%) also had a language arts component. In addition, there were six instructional programs which covered the science and social studies areas.

Grade level. Grade level refers to the grades for which the programs were intended. Table D-7 shows the frequencies and percents of the successful reading and mathematics programs that were designed for each grade level. The criteria for selecting individualized programs assured that each program had been used at one or more of grades Kindergarten through 6. Grades 1 through 3 tended to be more frequently represented than other grade levels. However, most of the programs were intended for more than one grade level, many for seven levels. All lower-grade mathematics programs included grades 1 and 2, and all upper-grade programs included grade 6.

Mode of program. Program mode refers to whether the program was computer-assisted, computer-managed, or noncomputerized. Only four reading programs and two mathematics programs were computer-managed. There was only one computer-assisted program, in mathematics. Most of the selected programs (about 95%) were noncomputerized.

Target students. Table D-8 shows the frequencies and percents for the selected programs by the types of students they were intended for. The majority of the reading programs (58%) were intended for disadvantaged or low achieving students, while about one-third of the reading programs were intended for all students. The majority of the mathematics programs (60%) were intended for all students, and about one-third were intended for the disadvantaged or low achieving. More mathematics than reading programs were intended for all students. A smaller percentage of programs for disadvantaged or low achieving students would probably have been found had not four of the evaluation reports considered only programs for the disadvantaged.

Extent of use. Extent of program use simply refers to the number of students, schools, and districts that used the program. The most current information available was used. The results are shown in Table D-9. About one-third of both the reading and mathematics programs were used by 100 to 499 students, about 20% were used by 500 to 999 students, and about 30% were used

by 1,000 to 9,999 students. There were very few programs used by under 100 students, or by over 10,000 students. It should be noted, however, that these results include the 17 popular programs of individualized instruction, each of which was used by at least 3,000 students during 1975-76.

Information on the number of schools using each program was not available for about 20% of the reading programs and 29% of the mathematics programs. About 55% of the programs were used in 10 schools or less. The reading programs were most often used in two to five schools (22%), while the mathematics programs were most often used in one school (29%). About 70% of the reading programs and 62% of the mathematics programs were used in a single school district. Again, data for the popular programs of individualized instruction are included in these results.

Training requirement. Table D-10 shows the types of individuals requiring formal training for program operation. Most of the programs (about 90%) required formal training for teachers, and about one-half of the programs required training for paraprofessionals. Some of the programs required training for school administrators and volunteers.

Information on the extent of the required training of teachers for program operation was not available for about one-half of the programs. About 50% of the programs for which data were available required formal training of one week or less, while about the same number of programs required more than one week of training.

Some factors affecting adoption. In addition to program costs and training requirement, some other program requirements which may affect program adoption were examined. They were the need for: (a) the services of a project director; (b) staff reorganization; (c) classroom modification; and (d) special facilities and equipment.

With regard to the need for the services of a project director, 85% of the reading programs and 74% of the mathematics programs had a project director or coordinator. However, most of the programs did not specify whether or not the project director was full-time, nor the extent to which such a position would be needed for routine, ongoing program operation. Federally supported programs would be expected to have project directors.

Staff reorganization was needed for 12% of the reading programs and 19% of the mathematics programs. As used here, staff reorganization refers to

changes in organizational structure, and not simply to hiring new or additional teachers.

Table D-11 shows the frequencies and percents of the selected programs which required classroom modification. Some modification was needed for 19% of the reading programs and 14% of the mathematics programs. Many modifications were needed for 4% of the reading programs and 7% of the mathematics programs. There was also a tendency for upper-grade reading programs to need more classroom modification than lower-grade reading programs. As used here, classroom modification means physical changes, and not just the rearrangement of things in a classroom.

About 61% of the reading programs and 43% of the mathematics programs required special facilities and equipment which had to be added or purchased because of the program. Upper-grade programs tended to need more special facilities and equipment than did lower-grade programs.

In general, the majority of the programs had the services of a project director and needed special facilities and/or equipment. Staff reorganization or classroom modification was required in less than 25% of the selected programs.

Degree of parent/community involvement. Involvement refers to: (a) working as a classroom volunteer, tutor, or resource person; (b) participating in student evaluation; or (c) participating in parent education. As Table D-12 shows, parents were involved in more than half of the reading and mathematics programs. There was extensive parent/community involvement in 22% of the reading programs and in 26% of the mathematics programs. Grade level analyses showed that the lower-grade programs had more parent involvement than the higher-grade programs.

Characteristics of Objectives

This section includes information on the characteristics of the program goals and learner objectives, and information on the origin of learner objectives for the 74 individualized reading and 42 individualized mathematics programs.

Emphasis of program goals. The categories used to note the primary emphasis of program goals were: (a) develop or extend academic skills; (b) develop positive attitude and self-concept; and (c) individual development as a self-directed, independent learner. Table D-13 shows the frequencies and percents of the selected programs by program emphasis. All of the reading and mathematics programs stressed academic skill development, which is to be expected since one

of the criteria used to select individualized programs was that the teaching of reading or mathematics must be a primary goal. About one-half of the programs stressed the development of positive attitudes, while only 15% of the reading and 24% of the mathematics programs stressed individual development as a self-directed learner.

Characteristics of learner objectives. Learner objectives, not to be confused with program objectives, are those objectives that individual students are required to master. They are sometimes called behavioral objectives, instructional objectives, or skills. The characteristics of learner objectives were considered in terms of their degree of specificity and whether they were written or not. Most of the programs (73% of the reading programs and 79% of the mathematics programs) had written specific objectives, while about 15% of the programs in each subject had written but general objectives. Only 7 of the programs (6%) did not have written student learning objectives. These results are shown in Table D-14.

Origin of learner objectives. As Table D-15 shows, for over 70% of the programs the learner objectives were developed by program staff. For about 20% of the programs, the objectives were adopted from another source. The information was not available for about 10% of the selected programs.

Diagnostic and Prescriptive Procedures

This section includes information on the characteristics of the selected programs with regard to their diagnostic and prescriptive procedures, such as who diagnosed student learning needs, how often student needs were diagnosed, and whether or not there was a written prescription for each student.

Factors considered in determining learning needs. Table D-16 shows the frequencies and percents of the selected programs by the factors considered in determining student learning needs and requirements. Student achievement level was the most often considered factor (about 98% of the programs). Other factors considered were student interest (about 18% of the programs), learning style (about 15%), and student aptitude (about 12%). The differences between the reading programs and the mathematics programs were not great. Student aspirations were not considered by any of the programs.

Primary sources of diagnostic data. Table D-17 shows how often various sources of data were used in the diagnosis of individual student learner needs or requirements. Criterion-referenced achievement tests were the most often

used source of data on student learning needs (over 70% of the programs). Student past performance was also a frequently used source of diagnostic data (45% of the reading programs and 29% of the mathematics programs). Other often used data sources were norm-referenced achievement test (about 27% of the programs) and teacher opinion (about 22% of the programs). There was some tendency for teacher opinion to be used more in the lower-grade level programs and for achievement tests to be used more in the upper-level programs. Most programs used more than one data source in diagnosing student needs.

Individual who diagnoses student needs As Table D-18 shows, student learning needs or requirements were diagnosed most often by the teacher (78% for the reading programs and 88% for the mathematics programs). Sometimes, student needs were diagnosed by a team of teachers (16% for the reading programs and 12% for the mathematics programs), or by other school staff, mostly reading or mathematics specialists (18% for the reading program, 12% for the mathematics programs). In very few cases did a student or parents diagnose the learning needs of the student.

Frequency of diagnosis. Table D-19 shows the frequencies and percents of the programs by frequency of diagnosis of student learning needs or requirements. A program would not have been selected as individualized if such diagnoses were not made. About 43% of the reading programs and 50% of the mathematics programs reported that students were diagnosed at the beginning of each instructional unit. The length of an instructional unit varied from one day to four weeks depending on the program. Almost one-half of the programs reported that students' needs were diagnosed at the beginning of a semester or school year. It should be noted that many programs diagnosed student needs at the beginning of an instructional unit as well as at the beginning of a school year. About 27% of the reading programs and 21% of the mathematics programs reported continuous or daily diagnosis. A larger percentage of upper- than lower-grade level progams reported diagnosis at the beginning of a semester.

Reasons for student diagnosis. Table D-20 shows the frequencies and percents of the programs by the reasons why student learner needs or requirements were diagnosed. For about 78% of the programs student needs were diagnosed to determine a series of instructional objectives or skills for the student to study. Student needs were also diagnosed to determine learning activities (about 54% of the programs) and learning materials to be used (30% for the reading programs and 21% for the mathematics programs). Many programs diagnosed

student learning needs in order to determine both instructional objectives and learning activities, or to determine both learning activities and learning materials to be used.

Individual who made prescriptions. As Table D-21 shows, most often (80% of the reading and 91% of the mathematics programs) the teacher prescribed the instructional objectives and/or learning activities for the student. Other persons who made prescriptions were the student, a team of teachers, and other school staff such as reading or mathematics specialists.

Frequency of prescription. Table D-22 shows the frequencies and percents of the 74 reading and 42 mathematics programs by the frequency of prescription. For most reading programs, prescriptions of programs of studies were made either on a daily basis (38%), or at the beginning of each instructional unit (37%). For the mathematics programs, prescriptions were most often made at the beginning of each unit (43%), or on a daily basis (31%). For several programs prescriptions were made on a weekly basis, or at the beginning of a semester.

With regard to the format of prescriptions, about 66% of the reading programs provided for a written individual plan or contract for each student, while 57% of the mathematics programs had such a written plan or contract.

Instructional Procedures and Materials

This section includes information on the characteristics of the effective individualized programs with regard to their instructional procedures and materials, such as the length of the instructional period, pacing, use of materials, and class organization.

Program attendance. Program attendance refers to which students attend the program. As data in Table D-23 show, about 45% of the reading programs and 64% of the mathematics programs were attended either by all students of a given grade level, or by all students in a school. About 47% of the reading programs and 21% of the mathematics programs were attended by students identified by formal diagnostic procedures. As will be noted below, these programs are usually used for supplemental or remedial work. There were several programs attended by all students classified in an identified subgroup, such as Follow-Through or migrant children.

Table D-24 and Table D-25 show cross-tabulations of program attendance versus typical class size. The data indicate that the programs attended by students identified through formal diagnostic procedures tended to have smaller

typical class size.

Program use. Table D-26 shows the frequencies and percents of the programs by the way they were used in the schools. About half of the reading programs were used to provide all of the instruction in reading, while 50% were used for supplementary or remedial work. The percentage of programs used for supplemental and remedial work would probably have been lower if four evaluation studies had not considered only programs for the disadvantaged. In the mathematics area, most programs (79%) were used as a regular program (that is, for all instruction in mathematics), while 21% of the mathematics programs were used for supplementary or remedial work only. Lower-grade level reading programs tended to be used for all reading instruction, while upper-grade level reading programs were used for supplemental or remedial work.

As data in Tables D-27 and D-28 show, most of the programs attended either by all students of given grade level or by all students in a school were used for all instruction in the subject area. Most of the programs attended by students selected by formal diagnostic procedures were used for supplementary or remedial work. The programs attended by all students classified in an identified subgroup (e.g., Follow-Through) were ususally used for all instruction in the subject area.

Table D-29 and Table D-30 show cross-tabulations of program use and typical class size. The programs used for supplementary or remedial work tended to have smaller typical class size than the programs used for providing all instruction in the subject area.

Length of student use. Most of the programs (85% of the reading and 93% of the mathematics programs) were designed for use for a whole school year. None of the programs were designed for a semester use. There were three reading programs designed for less than a semester use. The period of use for the remaining programs (eight reading and three mathematics programs) varied and was based on the needs of individual students or the desire of a particular school.

Frequency of instruction. Frequency of instruction refers to the number of times per week a student received instruction provided by the program. About 80% of the reading programs and 93% of the mathematics programs provided instruction five times a week. Several programs provided instruction four times or less per week. The frequency of instruction in a few programs varied since it was based upon the needs of individual students. The results are shown in Table D-31.

Length and time of instruction. As shown in Table D-32, information on the length of the instructional period was not available for 12% of the reading programs and 21% of the mathematics programs. For about 38% of the programs, the instructional period was 31 to 60 minutes. About 20% of the programs had instructional periods of 30 minutes or less. For the remaining programs, the instructional period was more than 60 minutes, or the length varied depending on the needs of individual students.

The relationship between the frequency of instruction and the length of the instructional period was examined. However, no consistent relationship was found.

The time of the day that students received instruction was scheduled in most of the programs (95% of the reading programs and 88% of the mathematics programs), as might be expected. However, three reading programs and three mathematics programs did allow some flexibility for students to choose the time they studied.

Number of minutes of instruction per week. The number of minutes of instruction per week was determined from the frequency and length of instruction. As may be seen in Table D-33, about 20% of the reading and 29% of the mathematics programs had 201 to 250 minutes of instruction per week. None of the mathematics programs had over 400 minutes of instruction per week, although about 14% of the reading programs did.

The number of minutes of instruction per week was also considered in terms of program use. Hence, Table D-33 also shows data for the 39 reading and 33 mathematics programs that were used for all instruction in their subject area, and for the 35 reading and nine mathematics programs used for supplementary or remedial work. There was a tendency, more apparent for mathematics than reading, for programs used for supplementary or remedial work to have fewer minutes of instruction per week than programs used for all instruction in the subject area.

The number of minutes of instruction per week by typical class size is presented in Table D-34 and Table D-35. No particular relationship was found between the number of minutes of instruction per week and typical class size. In addition, no relationship was found when programs used for all instruction in the subject area and programs used for supplementary or remedial work were considered separately.

Determination of instructional unit completion. Table D-36 shows the frequencies and percents of the programs in terms of when a student stopped working on a given unit of instruction. In 80% of the reading programs and 71% of the mathematics programs the student was to work on a unit of instruction until a specific mastery or achievement level, defined by the program, was reached. In several programs, the student was to work on a unit until he finished all the learning activities specified for the unit. Also, there were a few programs where the student was to study a unit of instruction for the specific amount of time assigned to the unit.

Allowing the start of a new instructional unit. After a student completed an instructional unit, most of the programs (about 80%) allowed the student to go ahead and start work on a new unit. However, about 10% of the programs did not allow it until members of the student's subgroup or class were ready for the new unit. There was also a tendency for more upper-grade level than lower-grade level programs to allow a student to go ahead when ready. The information was not available for about 10% of the programs.

How unit completion time varied. Table D-37 shows the frequencies and percents of the programs in terms of whether the amount of time for the completion of an instructional unit differed for each student, was the same for a subgroup of students, or was the same for all students in the class. In nearly 80% of the programs the amount of time in which an instructional unit was completed was different for each student. In about 12% of the reading programs and 17% of the mathematics programs, unit completion time was subgroup-paced. Only two reading programs required all students in the class to complete an instructional unit in the same amount of time. As expected, most of the programs which allowed each student a different amount of time to complete a unit also allowed the student to start a new unit as soon as the previous unit was completed. These are two conditions necessary for self-pacing.

Table D-38 and Table D-39 show the relationship between how unit completion time varied and typical class size. The data indicate that class size did not seem to be related to whether a program allowed a different amount of time for each student to complete an instructional unit or required the same amount of time for a group of students.

Provision for alternative learning objectives and materials. About 53% of the reading programs and 57% of the mathematics programs were designed to

teach the same objectives or subject content to all students in the program. That is, all students in the program were expected to eventually master the same objectives. About 43% of the reading programs and 38% of the mathematics programs reported that all the students in the program did not have to master the same objectives. However, it should be noted that the degree of flexibility or range of alternatives is unknown. What is known is the fact that all students were not expected to master the same objectives by the program exit point.

The term "alternative learning materials" was employed here very broadly and included the use of more than one basal reader, different instructional media to teach given instructional objectives or skills, etc. About 90% of the reading programs and 80% of the mathematics programs had alternative learning materials that could be used for mastering their instructional objectives.

Materials and equipment used. Table D-40 shows the frequencies and percents of the programs by the type of material and equipment used. Paper products (textbooks, workbooks, etc.) were most often used (97% of the reading programs and 93% of the mathematics programs). Audiovisual materials and kits (including charts and games) were also used by a majority of the programs. There was only one program which used only standard classroom texts. Most of the programs (86%) had provision for student use of learning materials with a wide range of different difficulty levels.

Instructional area used. Table D-41 shows the frequencies and percents of the programs by instructional area used. A typical classroom was used in about 40% for the reading programs and 60% of the mathematics programs. A center or laboratory was used in about 40% of the reading and 20% of the mathematics programs. The remaining programs used a room larger than a typical classroom for about 30 students, or any available space smaller than a classroom. There was a tendency for lower-grade reading and mathematics programs to use a typical classroom, and for upper-grade reading programs to use a center or laboratory.

Typical class size. As shown by the data in Table D-42, 43% of the reading programs and 67% of the mathematics programs had a typical class size of 21 to 30 students. About 22% of the reading and 12% of the mathematics programs had 9 to 20 students. A small size class with less than nine students was found more often among the reading programs (24%) than the mathematics programs (7%). Less than 10% of the programs in each subject area had more

than 30 students per class.

Class organization. Class organization refers to instructional grouping practices used in the classroom. Table D-43 shows the frequencies and percents of the programs by class organization. Most programs used more than one class organization. In reading, the most often used organizations were: small groups, 2-5 students, 73%; work independently with occasional guidance as needed, 69%; and individual tutoring, 50%. In mathematics, the most often used organizations were: work independently with occasional guidance as needed, 86%; small groups, 74%; and large groups, over 5 students, 45%. Only 20% of the reading programs and 14% of the mathematics programs reported whole class pursuit as an instructional grouping practice.

As Tables D-44 and D-45 show, there were no particular relationships between typical class size and class organization. For instance, the proportion of programs having small group pursuit or individual pursuit did not vary much regardless of the class size.

For 51% of the reading programs and 55% of the mathematics programs, grouping within class was based on a student's learning need at a particular time, that is, on the instructional unit or learning task he or she was working on. For 30% of the reading and 36% of the mathematics programs, the grouping was based on general achievement level in the subject area. There were several programs where the grouping was based on student interest. Table D-46 presents more detailed information on the basis of grouping students within class.

Personnel required for typical class. Table D-47 shows the frequencies and percents of the programs by number of personnel required for typical class size. About 70% of the reading programs and 80% of the mathematics programs required one typical, credentialed teacher per class, and there were several programs which required two, three, or four typical teachers. Fifteen percent of the reading and 5% of the mathematics programs did not require a typical teacher. These programs usually required a full-time specialist instead, or a full-time paraprofessional under a master teacher. About 20% of the reading programs required a full-time or part-time reading specialist. Only 5% of the mathematics programs required a mathematics specialist.

For about one-half of the programs each class had at least one paraprofessional. Another 22% of the reading programs and 12% of the mathematics programs had a paraprofessional less than half-time. As expected, more lower-grade programs

had paraprofessionals than upper-grade programs. Also, about 20% of the programs used the services of volunteers.

As Table D-48 shows, the most frequent student:adult ratio was about 8:1 (i.e., from 5.1:1 to 10.4:1). The student:adult ratio was based upon the number of personnel required for typical class size, excluding student tutors and personnel working with the class less than half-time. About 27% of the reading programs and 21% of the mathematics programs had a ratio of about 8:1. The median student:adult ratio for the reading programs was about 10:1, while for the mathematics programs it was about 14:1. The ratio ranged from 1:1 to 33:1. There was no clear tendency for lower-grade programs to have a lower student:adult ratio.

Record keeping. Records of student diagnosis/prescription and progress were kept by the teacher or specialist in most of the programs (70% of the reading and 74% of the mathematics programs). Paraprofessionals kept student records in about 25% of the programs. Less frequently student records were kept by the students themselves, by volunteers, or by a computer. These results are shown in Table D-49.

Learner Evaluation and Assessment Procedures

This section includes information on the characteristics of the 74 reading and 42 mathematics programs with regard to student progress monitoring: the frequency of progress checking; source of learner evaluation data; and whether or not progress checking data were also used for diagnostic purposes. The concern is with the assessment of student mastery of previously assigned instructional objectives before additional instruction is given, and not with program evaluation which is discussed later.

Frequency of progress checking. As shown in Table D-50, for 61% of the reading and 64% of the mathematics programs, student progress was evaluated at the end of each instructional unit. About 18% of the reading programs and 14% of the mathematics programs had continuous or daily progress checking. Other programs had weekly or end of semester evaluation of student progress. It should be noted that these categories overlap each other because an instructional unit was defined differently by various programs. The average time needed to complete an instructional unit ranged from one day to four weeks.

Source of data for progress checking. Table D-51 shows the frequencies and percents of the programs by source of data used in learner evaluation and

assessment. Test data were used for this purpose in 73% of the reading and 69% of the mathematics programs. Other objective data (e.g., completion of assignment, student performance on worksheets, etc.) were also used very frequently (over half of the selected programs). The teacher's subjective judgement was used in several programs. In many cases, more than one source of data was used to evaluate student progress.

Use of progress checking data for diagnostic purposes. About two-thirds of both the reading and mathematics programs used progress checking data for diagnostic purposes too. An additional 5% of the reading and mathematics programs sometimes used assessment data for diagnostic purposes. However, it was not clear in many cases to what extent the data were used in the formal diagnostic process of a program.

Program Evaluation

This section includes information on the characteristics of the 74 reading and 42 mathematics programs with regard to the evaluation of program effectiveness, such as evaluation instruments used, evaluation design, and concerns stated in evaluation reports. Included are data used to determine that a program was a success. The results presented generally reflect both the criteria used to identify effective programs, and federal evaluation guidelines.

Tests used in program evaluation. Table D-52 shows a list of tests used in program evaluations and the frequencies of their reported use. Most frequently used were the Gates-McGinitie Reading Tests, Metropolitan Achievement Tests, and California Achievement Tests for the reading programs, and the Metropolitan Achievement Tests and Stanford Achievement Tests for the mathematics programs. There were 12 different tests which were used in three or more programs. All of them were norm-reference tests. The appropriateness of using such tests to evaluate individualized programs is discussed in the following section.

As Table D-53 shows, most of the tests used in evaluating program effectiveness were tests published by test publishers. Only about seven percent of the tests used in program evaluation were program-developed tests.

Evidence of cognitive gains. As may be seen in Table D-54, the evaluation designs most often used to determine cognitive gains or benefits in reading were: pre- and posttests using standardized tests without a control group (55%);

and the same design with a control group (26%). For mathematics programs, the most often used evaluation designs were: pre- and posttests using standardized tests with a control group (41%); and the same design without a control group (33%). There were several programs which employed a posttest-only design using a standardized test with or without a control group.

About two-thirds of the reading programs and one-half of the mathematics programs reported evidence of cognitive gains on two or more groups of students over one school year. Each grade level was considered a separate group of students. About 16% of the reading and 24% of the mathematics programs reported similar evidence over more than one school year. Other programs reported evidence on only one group of students. More detailed information is shown in Table D-55.

Evidence of affective gains. There were 38 reading programs and 25 mathematics programs that had noncognitive gains as one of their program goals. However, evidence of achieving noncognitive goals was reported for less than one-half of these programs. Among those reporting evidence, no particular evaluation design was used more often than others. The results are shown in Table D-56. Among the programs reporting evidence of noncognitive gains, more than half reported evidence on two or more groups of students over one school year. More detailed information is given in Table D-57.

Other sources of data used in program evaluation. Some programs reported the use of sources of data other than tests to assess program effectiveness. Table D-58 shows the frequencies and percents of the programs by source of data used. Teacher questionnaire data were used most often. Other frequently used sources were parent questionnaires and classroom observation.

Concerns reported. Only a small number of the programs reported any concerns regarding program effectiveness or operation. This may be partly due to the fact that not all the available documents on each program were necessarily reviewed in this study. Coordination and communication problems between regular classroom teachers and learning center staff were reported for three programs. Twelve other concerns were mentioned for one or two programs, such as scheduling difficulty, cost, and cooperation from school administrators.

Issues Concerning the Use of Various Types of Achievement Tests in the Evaluation of Individualized Programs

One of the major questions addressed by this study was the appropriateness

of the various assessment instruments used to measure the success of the individualized instruction programs. As reported in the previous section, all of the tests which were used in more than three programs to evaluate program effectiveness were norm-referenced achievement tests. Therefore, the appropriateness of using a norm-referenced achievement test to evaluate the effectiveness of an individualized instruction program becomes a critical issue. To compile research findings and authoritative opinions on this issue selected books and 18 journals in the areas of educational technology, psychology, and measurement were reviewed. This literature search was not very productive, because few authors directly dealt with the issue. However, a considerable number of articles were found which addressed the problems associated with the use of standardized tests in program evaluation in general. The findings are summarized below. In addition, the problems associated with using criterion-referenced tests in program evaluation are examined. The use of criterion-referenced tests to obtain data on individual student needs or on individual student progress is a separate issue and is not considered here.

Use of Standardized Tests in Program Evaluation

Standardized tests are so called because the administration procedures (directions, time limit, scoring, etc.) are standardized. A certain degree of standardization is required regardless of whether a test is norm referenced or criterion referenced, or whether it is made by a teacher or a test publisher. However, since standardized achievement tests are usually published by test publishers and they are norm referenced, the term "standardized test" is used in this report to refer to a commercial, norm-referenced achievement test. The standardized test has some distinct features. They are: (a) it is based on the general content and objectives common to many schools; (b) it deals with large segments of knowledge and skill; (c) it attempts to measure individual differences; and (d) it provides norms for the interpretation of test scores. These features of the standardized test represent its strengths as well as its weakness as an instrument for use in the evaluation of educational programs.

The appropriateness of the use of standardized tests in the evaluation of program effectiveness has been seriously questioned for many years. For instance, Glaser (1963) and Stake (1967) pointed out that standardized tests are notably weak in discriminating among educational programs because their strength is directed toward discrimination among students. They argued that

for the evaluation of treatments or group differences, a new type of measure has to be developed. More recently, Skager (1971) and Tyler (1974) described the inadequacies of standardized tests for program evaluation. The major criticisms were:

1. Tests designed for the national market are constructed to sample topics common to the curriculum of most school systems. Thus, a given test does not reflect the educational objectives of a particular program.

2. Test items are selected based on their discriminating power among individual students, not because they are either measuring typical behaviors emphasized in a given grade level or are particularly sensitive to instructional effect. As a result, the test is correlated highly with student aptitude rather than with instructional effect.

3. The standardized test includes too small a number of items appraising the learning of students who markedly deviate from the average. On most standardized tests, there are less than 5% "easy items" which are answered by 75% or more of the norm group. Thus, the tests do not furnish a reliable measurement for low- or high-achieving students.

In addition to the above major criticisms, Tallmadge and Horst (1974) pointed out other problems associated with the use of standardized tests in program evaluation, particularly the problems of inadequate norms and the use of grade equivalents. Also, Wright (1969) suggested that the standardized test is not appropriate for individualized programs because students in the individualized system are not exposed to the same content or instructional objectives at the same time. When a standardized test is administered, some students would be considerably ahead, while others would be considerably behind, compared to the given level of the tests.

Although there have been criticisms of standardized tests, many people have suggested that most of the criticisms are ill-founded or exaggerated. For instance, Ebel (1973) and Sax (1974) argued that standardized tests measure important subject-matter content reasonably well, and it is important to measure common objectives emphasized in most instructional programs. They also pointed out that test users can make a selection from a variety of achievement tests with different curricular emphases.

In response to the criticism that the standardized test measures student aptitude rather than achievement, proponents of standardized tests argued that neither norm-referenced nor criterion-referenced tests will reflect

instructional outcomes uninfluenced by aptitude or other skills previously acquired, particularly when items measure student achievement in complex cognitive skills. Also, if an achievement test is very sensitive to instruction, it may be measuring mostly trivial, short-term objectives.

With regard to the criticisms about the inadequacy of standardized tests for low-achieving students, it can be argued that problems can be minimized by determining the appropriate level of a test on the basis of the achievement level of the students rather than on their nominal grade level. Also, different levels of a test can be used when there is a wide variation in the achievement levels of the students in any given group.

Use of Criterion-Referenced Tests in Program Evaluation

A criterion-referenced achievement test has been defined in the literature in a multitude of ways. In general, however, it has the following characteristics: (a) instructional objectives are specified; (b) test items are keyed to specific instructional objectives; (c) the test attempts to measure specific knowledge or skills that students are able to demonstrate; and (d) it provides a student performance score in terms of specified standards, independent of the performance of other students.

A number of authors believed that the main distinction between criterion-referenced and norm-referenced tests is the way student performance is interpreted and not the nature of the test or the method of development (e.g., Hambleton & Novick, 1973; Sax, 1974; Gronlund, 1976). However, they also agreed that tests can and should be constructed deliberately geared to either criterion-referenced or norm-referenced interpretation.

In the past, criterion-referenced achievement tests were developed by individual teachers or individual programs. Recently, however, several test publishers (e.g., CTB/McGraw-Hill, IOX Test Development Service) have started to publish criterion-referenced tests. This new type of achievement test has been used extensively, especially for individualized instructional programs, because the testing of student mastery of instructional objectives plays a prominent role in such programs (Baker, 1971; Hambleton, 1974). To obtain information necessary for the day-to-day operation of instructional programs, most people agreed that a criterion-referenced measure is more useful than a norm-referenced measure. However, there is wide disagreement about the appropriateness of using a criterion-referenced achievement test in program evaluation. The major criticisms are:

1. "Effectiveness" is a relative term in educational program evaluation, and some standard is needed to compare against. Unless two programs have the same objectives, a criterion-referenced test designed for one program cannot be used to determine the effectiveness of another program (Shoemaker, 1972). Also, the use of criterion-referenced tests, by definition, precludes comparisons with norm groups (Tallmadge & Horst, 1974). A program can set its own absolute criteria for "effectiveness" or "success," but it will be arbitrary and subjective.

2. Since the criterion-referenced test emphasizes specific, behavioral objectives, it tends to cover readily measurable but trivial instructional objectives at the expense of cognitively complex and educationally significant objectives (Ebel, 1973; Gronlund, 1976). The test may be satisfactory in training situations, but school learning calls for much more complex cognitive development than the acquisition of a set of readily definable, discrete skills.

3. It requires a considerable amount of testing time to measure student achievement with a criterion-referenced test. As a result, with a given amount of time available for testing for program evaluation, either many instructional objectives will very likely not be covered, or each objective will be covered by only a few items (Hambleton, 1974; Sax, 1974).

4. Although several suggestions have been made (Popham & Husek, 1969; Hambleton & Novick, 1973; Millman, 1973), criterion-referenced measurement seems to lack a generally accepted theory of testing (reliability, validity, determination of mastery level, etc.). To the extent that its properties are unknown, any evaluation based on a criterion-referenced test is uncertain. In particular, the determination of a cutoff score is arbitrary and sometimes meaningless. Even if the cutoff score is valid, the chance for making a wrong decision is large because of the small number of items covering a given objective.

5. Scores produced by a typical criterion-referenced test are usually too detailed to be used in program evaluation. Even though more detailed and specific descriptions of test results can be defended on theoretical grounds and on their usefulness in the day-to-day instructional process, they become too cumbersome and complicated for use in program evaluation.

Most of the above criticisms have been answered by the proponents of criterion-referenced tests. For instance, they argued that the most important

consideration in program evaluation is the degree to which the program objectives have been met. The needed information can be obtained most effectively through a specifically designed test based on the objectives of the particular program. Also, they suggested that one can use the common-unique objectives approach proposed by Shoemaker (1972), if cross-program comparisons are desired.

In response to the criticism that the criterion-referenced test lacks an adequate theoretical basis, it has been argued that a considerable amount of work has already been done in the area. For instance, Millman (1973) proposed guidelines for setting cutoff scores, and Hambleton and Novick (1973) presented a synthesis of theory for criterion-referenced tests.

With regard to the criticism that the administration of a criterion-referenced test covering a whole school year of curriculum would be much too long, the proponents of the test suggested that a shortened version based on selected objectives can be used for program evaluation purpose. Alternately, the matrix-sampling technique can be utilized because individual scores on all instructional objectives are not required in program evaluation. Also, it can be argued that one can devise a measure of program effectiveness based on the test data routinely accumulated during the school year. Examples are the average number of instructional objectives that students mastered during the year, or the percentage of students who completed assigned (expected) learning units.

In summary, no highly informative literature exists on the appropriateness of using standardized tests or criterion-referenced tests in the evaluation of the effectiveness of individualized instruction programs. There is probably concern in this are, but so far it has not been directly addressed. The literature indicted, however, that while standardized tests are not ideal instruments for the evaluation of individualized programs, they are efficient and reliable instruments, and they cover important aspects of reading and mathematics achievement reasonably well.

Attempts to Classify and Group Effective Individualized Programs

An attempt was made to classify the effective programs of individualized instruction in terms of theoretical models. In addition, an attempt was made to empirically group programs in terms of selected variables. If either of these attempts were successful, it would be possible to tell what types of

individualized instruction are more common among the successful individualized reading and mathematics programs that were identified for grades Kindergarten through 6. The results of the endeavors are discussed below, following a presentation of the theoretical models used for program classification.

Models of Individualized Instruction

From the literature review presented in the Introduction of this report, it was apparent that the purposes of typical developmental efforts in individualized instruction throughout our educational history were to: provide students with alternative goals to meet their individual needs; provide students with alternative forms of instruction; allow students to progress at their own rate; and allow students to participate in decision making related to their learning. Also, an examination of various definitions of individualized instruction indicated that the major concern of individualization is how to adjust instruction to individual needs by means of options in objectives, alternative instructional methods and materials, and individual pacing. In addition, the common elements or variables used in the several schemes for classifying individualized programs seemed to be: the existence of alternative goals for different students; the availability of alternative instructional treatment for different students; individual pacing; and self-determination of goals and/or instructional treatment.

In summary, the literature clearly indicated that, in spite of all the variations and different emphases, there are certain elements or variables common to most discussions of individualized instruction. They are: (a) options in the instructional objectives or content for different students to master; (b) alternative instructional methods and materials; (c) individual pacing; and (d) self-determination of objectives and/or learning methods and materials. Fourteen of the 16 possible combinations of these four variables can be considered theoretical models of individualized instruction. The remaining two combinations are not appropriate as models of individualized instruction by definition. That is, they represent instructional programs wherein the objective is fixed, instructional methods and materials are fixed, and individual pacing is not allowed. The characteristics of the 14 theoretical models are shown in Table 1.

Classification in Terms of Theoretical Models

Using available data, an attempt was made to classify the 74 reading and

42 mathematics programs in order to determine how many of them represented one of the 14 theoretical models. It should be noted, however, that some of the 14 models may not be represented by programs in actual use. Also, many would not be represented in a study such as this which dealt with a relatively narrow range of programs in terms of grade level (grades Kindergarten through 6 only) and subject area (reading and mathematics only).

Table 1 shows the number of programs classified in each model. There were 24 reading programs (32%) and 12 mathematics programs (29%) in Model 11, which provides for alternative learning materials and individual pacing.

Table 1

Number of Programs Classified in Each Theoretical Model

Model	Characteristics[a]				All Reading Programs		All Mathematics Programs	
	Alt. Obj.	Alt. Mater.	Ind. Pace	Self-Deter.	Freq.	Percent (N=74)	Freq.	Percent (N=42)
1	Yes	No	No	No	0	.0	0	.0
2	Yes	No	No	Yes	0	.0	0	.0
3	No	Yes	No	No	4	5.4	1	2.4
4	No	Yes	No	Yes	0	.0	0	.0
5	No	No	Yes	No	5	6.8	4	9.5
6	No	No	Yes	Yes	0	.0	0	.0
7	Yes	Yes	No	No	3	4.1	0	.0
8	Yes	Yes	No	Yes	0	.0	0	.0
9	Yes	No	Yes	No	1	1.4	2	4.8
10	Yes	No	Yes	Yes	0	.0	0	.0
11	No	Yes	Yes	No	24	32.4	12	28.6
12	No	Yes	Yes	Yes	2	2.7	2	4.8
13	Yes	Yes	Yes	No	19	25.7	6	14.3
14	Yes	Yes	Yes	Yes	1	1.4	2	4.8
Unclassified					15	20.3	13	31.0

[a]The four characteristics are provisions for: alternative objectives; alternative methods or materials; individual pacing; and self-determination.

Another frequently found model was Model 13, which provides for alternative objectives as well as alternative materials and individual pacing. Five reading programs and four mathematics programs were classified in Model 5 (individual pacing only). There were 15 reading programs (20%) and 13 mathematics programs (31%) which could not be classified in terms of the 14 models.

Some additional characteristics of the programs representing Model 11 and Model 13 were compared. The majority of Model 13 programs (68%) were intended for disadvantaged or low achieving students, while only about one-third of Model 11 programs were intended for this group of students. Also, the majority of the Model 13 programs were used primarily for supplementary or remedial work, while most of the Model 11 programs were used for providing all instruction in the subject area.

Grouping in Terms of Selected Variables

As was noted above, an attempt was made to classify the successful programs of individualized instruction in terms of the theoretical models inferred from the review of the literature. In a further attempt to locate clusters or groups of programs with common characteristics, nine dichotomous (Yes - No) variables of concern were first identified. They were: (a) the program had written specific learner objectives; (b) the frequency of diagnosis was more often than only at the beginning of a semester or school year (that is, it was continuous or daily, or at the beginning of each instructional unit); (c) there was a written individual plan or contract for each student; (d) students who attended were identified by a formal diagnostic procedure; (e) the program was used primarily for supplemental or remedial work; (f) a student was allowed to start a new instructional unit as soon as he completed the previous unit; (g) the amount of time in which an instructional unit was completed was different for each student; (h) all students were expected to eventually master the same instructional objectives or subject content; and (i) there was provision for alternate learning material for mastering a given instructional unit or subject content.

All 116 individualized instruction programs were compared on these nine dichotomous variables. From the comparison, a total of 11 groups of programs were found that contained three or more programs. One group (Group I) contained 21 programs, four groups (Groups II, III, IV, and V) contained four programs, and six groups contained three programs. All 11 groups accounted for 55 of the

116 individualized programs, or 47%. The five largest groups, those containing four or more programs, accounted for 37 programs, or 32%. The 21 programs in Group I had "Yes" for all variables except "Students who attended were identified by formal diagnostic procedure" and "Program used primarily for supplemental or remedial work." The programs in Group IV were similar to those in Group I, except that they did not have a written individual plan for each student. Groups II, III, and V were similar in that they had "No" for "Students who attended were identified by formal diagnostic procedure" and "Program used primarily for supplemental or remedial work." All three were also "No" for "All students in program expected to master same instructional objectives." Programs in Group II did not have written specific objectives, the frequency of diagnosis was only at the beginning of a semester for Group III, and programs in Group V did not have written individual plans for each student.

The characteristics of the five largest groups of programs on other variables were also considered. There was some tendency for Group I programs to have a longer instructional period per day than other programs, although the range for Group I programs was from less than 30 minutes to over 60 minutes. All Group IV programs and 17 Group I programs (81%) had typical class size over 20, while all programs in Groups II, III, and V had a typical class size of 20 or below. Group II had three programs (75%) with typical class size 1 to 8. All programs in Groups I, IV, and V met 5 or more times a week, while half of the Group II programs (two programs) met 1 to 4 times per week.

In general, then, the programs in Groups I and IV seem to be "regular" instructional programs where all students are eventually expected to master the same instructional objectives and the class sizes are relatively large. The programs in Groups II, III, and V seem to be "special" programs used primarily for supplemental or remedial work and attended by students identified by a formal diagnostic procedure. The students in one of these programs are not expected to master the same instructional objectives, and typical class sizes are smaller than for the "regular" programs.

DISCUSSION AND CONCLUSIONS

This section considers problems encountered, possible biases in the information collected, and conclusions that appear supported by the study.

Problems Encountered

It took considerably longer than anticipated to finalize the criteria for the selection of individualized programs. Two major problems occurred. First, the literature generally does not provide adequate working definitions of the term "individualized." Some authors are mainly concerned with the variables to be individualized, some are concerned with the techniques of individualizing, and others are concerned with the degree of individualization. Second, criteria were desired that would encompass broad or multiple definitions of individualized instruction. This was more difficult to accomplish than using a more restrictive definition, since the distinction between individualized instruction and more traditional instruction becomes less clear when the term is used broadly.

As originally planned, descriptions of individualized instruction programs were to have been obtained from evaluation reports, and other sources were to have been contacted only if supplementary information was needed to complete the data elements sheets. However, when it was decided to interpret the term "evaluation report" broadly to include any report that described procedures used to identify effective or successful programs, procedures had to be modified so that basic descriptive information was requested from program developers. It was also found that program descriptions in evaluation reports often did not contain enough information to complete the data elements sheets. Generally, they usually lacked detail about diagnostic and prescriptive procedures, instructional procedures and materials, and learner evaluation and assessment procedures. As a result, program developers had to be contacted so that additional descriptive materials about the programs could be requested.

Many problems were encountered in trying to obtain necessary information from program developers in a timely manner. Materials were not received by the time they were initially needed. At times, program directors would not send information after they said they would. Much time had to be spent in follow-up activities, including telephoning. In a number of cases, after materials were received they were found to be inadequate for describing the operation of the program, so additional contact was necessary.

Possible Biases in the Information Collected

A reasonable question to raise about this study is the extent to which the results presented above might be biased due to restrictions imposed by the authors of the evaluation reports that identified the programs as successful. The restrictions imposed on the programs reviewed by the 11 evaluation studies are shown in Table 2. For four studies (36%) only federally supported programs were considered, while there were no restrictions as to funding source for seven studies (64%). Four studies considered reading and/or mathematics programs only, while seven place no restriction on subject matter. No grade level restrictions were imposed by any of the studies. And, while four studies considered only programs serving disadvantaged students, seven studies did not.

In addition to the restrictions imposed on the programs reviewed by the authors of the evaluation reports, one might also question whether biases resulted from the success criteria used by those authors. Table 3 shows the frequency and percent of each criterion used by the authors of the 11 evaluation reports for selecting effective or successful programs. Twenty-four criteria are noted in the table, although 13 of them were used by only one or two evaluation studies. The most frequently used criterion, used by nine studies (82%), was significant cognitive gains. For example, Wargo et al. (1971) required statistically significant treatment gains and/or differences in favor of the program that could have occurred by chance no more than five times in 100 replications. Also required was educational significance--ability or achievement test gains greater than expected or observed for "average" children during a comparable period of time in a regular classroom.

The second most frequent criterion, as shown in Table 3, was the availability of program descriptions and/or evaluation reports. It was used by seven studies (64%). Significant affective gains, adequate sample size, and focus on educationally important objectives were each used as criteria for four studies. Generally, the criteria used seem to pertain most to evidence of effectiveness or success, the adequacy of that evidence, and the focus or goals of the programs.

From the information presented in Tables 2 and 3, it is apparent that some of the results of this study that are related to the description of individualized programs, such as funding source and target population, and to the

Table 2

Restrictions Imposed on Programs Reviewed by the 11 Evaluation Studies

Restriction	No. of Evaluation Studies
Source of Funding	
Federally supported programs only	4
No restrictions	7
Subject Matter Area	
Reading and/or mathematics programs only	4
No restrictions	7
Grade Level Served	
Specific grade level	0
All grade levels	11
Students Served	
Disadvantaged	4
All students	7

stress or emphasis of program objectives or goals, are biased. Also, results related to program evaluation, such as the kind of evaluation data (i.e., mostly standardized tests) and the evaluation design (i.e., mostly the use of pre- and posttests) are biased, because these were included as success criteria in some of the evaluation reports. However, it is also apparent that the authors of the evaluation reports did not select programs on the basis of their diagnostic, prescriptive, instructional, and individual learner assessment procedures or techniques. Hence, the results of this study should not be biased in these areas because of the criteria the authors of the evaluation reports used.

Other reasons for caution should be used in generalizing from the results of this study to individualized instruction programs in general are obvious but should be mentioned. For example, this study was restricted to programs judged to be successful on the basis of a set of explicit criteria that included demonstrated effectiveness or success. The characteristics of individualized instruction programs without demonstrated effectiveness or success may be quite

Table 3

Frequency of Each Criterion Used for Selecting Effective Programs in the 11 Evaluation Studies

Criterion	Frequency	Percent
Significant cognitive gains	9	81.8
Availability of program description/evaluation reports	7	63.6
Significant affective gains	4	36.4
Adequate sample size	4	36.4
Focus on educationally important objectives	4	36.4
Evidence of achieving program objectives	3	27.3
Replicability	3	27.3
Use of reliable measures	3	27.3
Use of sound evaluation design	3	27.3
Use of controls or national norms	3	27.3
Adoptability/exportability	3	27.3
Longevity of the program	2	18.2
Recency	2	18.2
Located in the U.S.	2	18.2
Demands on school resources	2	18.2
Stability of gains	1	9.1
Face validity of the program	1	9.1
Positive reaction of parents and community	1	9.1
Program focus on cognitive development	1	9.1
Clear procedures	1	9.1
Wide use of the program	1	9.1
Reasonable per-pupil cost	1	9.1
Conformance to federal guidelines	1	9.1
Evidence of pupil needs assessment	1	9.1

different. Also, the programs considered were restricted to instructional programs that had been used at one or more of grades Kindergarten through 6 in the basic skills areas of reading and mathematics. The operational characteristics of programs in other subject matter areas might well be different by, for

example, allowing the child more freedom of choice in terms of instructional objectives and methods, or requiring less frequent diagnosis. More student self-determination in choosing objectives and methods might also be expected in programs for higher grade level students.

Conclusions That Appear Supported by the Study

1. On both the theoretical and operational levels, programs of individualized instruction are heterogeneous.
   a. There are many definitions of the term "individualized instruction" and the operational characteristics of programs identified as "individualized" can also vary greatly. Emphases are often placed on different aspects of individualization, such as provisions for alternative goals, alternative instructional methods and materials, individual pacing, or self-determination in the instructional process.
   b. Attempts to classify successful individualized instruction programs on the basis of theoretical models or to group them on the basis of common characteristics left many programs unclassified. One theoretical model described 31% of the successful programs identified in this study. It provides for alternative learning materials and individual pacing, but not for alternative instructional objectives or for self-choice of objectives or learning materials.
2. Successful individualized instruction programs are used in various ways for different purposes.
   a. Among the individualized instruction programs identified as effective or successful, 58% of the reading programs were targeted for disadvantaged or low achieving students while 37% were targeted for all students. Conversely, more mathematics programs were targeted for all students (60%) than for disadvantaged or low achieving students (36%).
   b. The successful individualized instruction programs that were identified were used in one or more of three ways: for all of the instruction in reading or mathematics; for supplemental or remedial work; or for enrichment work. Most of them (62%) were used for all of the instruction in reading or mathematics, in which case all of the students of a given grade level or all of the students in the school usually attended. When a program was used primarily for supplemental or

remedial instruction, the students who attended were usually identified by a formal diagnostic procedure.

c. Some of the successful individualized instruction programs were used in small schools or school districts, while others were used in large schools or districts. Many, however, were used by only a relatively small number of students. About 40% of the successful individualized programs identified in this study were used by fewer than 500 students.

3. There seem to be a number of instructional features or practices common to most of the identified successful programs of individualized instruction. Some of them are:

a. Most of the successful programs had written instructional objectives. About 90% of the programs had written instructional objectives, and for 75% the objectives were quite specific. For about 70% of the programs the instructional objectives were developed by program staff, rather than having been adopted from another source.

b. Student learning needs or requirements were diagnosed frequently. About 25% of the programs provided for daily or continuous diagnosis, 46% for diagnosis at the beginning of a unit of instruction, and 46% for diagnosis at the beginning of a semester or school year. Many programs provided diagnosis at more than one of these points. Criterion-referenced achievement tests were the most often used source of data on individual student learning needs and requirements upon which programs of studies were prescribed. They were used for about 72% of the successful programs. Student past performance was also a frequently used source of diagnostic data (39%).

c. Eighty-four percent of the programs studied provided instruction five times a week. Several programs provided instruction four times or less per week. However, the length of the instructional period per day ranged from less than 15 minutes to over 90 minutes.

d. In most of the successful programs of individualized instruction, a given unit of instruction was studied by a student until a specific level of mastery was reached. This was found for 77% of the successful programs. About 80% of the programs allowed each student a different amount of time to complete a unit of instruction, and most of these allowed the student to start a new unit as soon as the previous unit

was completed. These are two conditions necessary for self-pacing, or allowing students to progress at their own rate.

e. Most of the successful programs used a variety of instructional materials. Eighty-six percent of the successful programs used a wide range of learning materials, while 87% had alternative materials that could be used for mastering a given instructional objective.

f. A number of class organizations for instructional purposes were used by most of the successful programs. In 75% of the programs, students worked independently with occasional guidance as needed. Small groups of two to five students were taught in 73% of the programs, while tutoring was used, as needed, in 47%.

g. Successful programs attended by students who had been identified through formal diagnostic procedures tended to have smaller typical class size.

4. Some instructional features or practices often considered necessary for successful individualization do not seem to be essential. For example:

a. Successful individualized instruction programs need not have small class size. Fifty-two percent of the programs that were studied had a class size of 21 to 30 students. Although the median student:adult ratio was 10:1 for reading programs and 14:1 for mathematics programs, about 30% of the programs had a ratio greater than 20:1.

b. There seems to be no particular relationship between class size and class organization for instructional purposes. For example, the percentage of successful individualized programs having small group pursuit or individual pursuit did not vary much regardless of class size.

c. Successful programs of individualized instruction can operate without a specially written individual plan or contract for each student. Only approximately 60% of the programs that were studied had such a document.

5. The procedures used to assess the effectiveness or success of individualized instruction programs were fairly traditional. Most of the tests used for program evaluation were commercial, norm-referenced, standardized achievement tests. Most neglected was the evaluation of noncognitive program objectives, with many programs stating such objectives but not reporting any attempt to assess the degree to which they were attained.

6. No highly informative literature exists on the appropriateness of using standardized tests or criterion-referenced tests in the evaluation of the effectiveness of individualized instruction programs. There is probably concern in this area, but so far it has not been directly addressed. The literature indicated, however, that while standardized tests are not ideal instruments for the evaluation of individualized programs, they are efficient and reliable instruments, and they cover important aspects of reading and mathematics achievement reasonably well.

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APPENDIX A

DESCRIPTIONS OF EVALUATION REPORTS

This Appendix contains descriptions of the following 11 evaluation reports:

Bowers, Campeau, & Roberts, 1974.

Crawford, Kratochvil, & Wright, 1972.

Epstein, Margosches, Schrader, & Walton, 1971.

Far West Laboratory for Educational Research and Development, 1975.

Foat, 1974.

Gordon & Brownell, 1972.

Hawkridge, Campeau, DeWitt, & Trickett, 1969.

Hawkridge, Chalupsky, & Roberts, 1968.

U. S. Department of Health, Education and Welfare, Office of Education, undated-b.

Walton, Esser, Epstein, Margosches, & Schrader, 1973.

Wargo, Campeau, & Tallmadge, 1971.

Bowers, J. E., Campeau, P. L., & Roberts, A. O. H. Identifying, validating, and multi-media packaging of effective reading programs (AIR-41200-12/74-FR). Palo Alto, Calif.: American Institutes for Research, December 1974. (ERIC Document Reproduction Service No. ED 101 272)

General Description

This report concerns a project conducted for the National Right to Read Program of the Office of Education to identify effective reading programs. It describes the process whereby such programs were searched for on a nationwide level and subsequently screened, as well as the development of multimedia information packages describing the successful reading programs selected. Over 1,500 programs were reviewed; of these, 14 were determined to be successful and 12 were selected to be packaged and distributed.

Educational Programs Reviewed

The programs to be screened were identified by a nationwide search that included any and all reading programs with documented evaluation results. There were no stipulations as to source of funding or group or institutional sponsorship in this stage of the selection process.

Target Population Served by the Programs Reviewed

Reading programs serving any age group or target population were considered appropriate for review.

Procedures Used for Identifying Effective Programs

Initial procedures for the identification of outstanding programs involved the development of a set of general criteria and a program nomination form (PNF) designed to elicit the name and location of possible projects in addition to subjective and documented evidence of their effectiveness. Nominations of exemplary programs meeting the established criteria were then solicited from several sources. These sources included an interdisciplinary panel of experts (Program Nomination Panel); various personnel within federal, state and local educational agencies; members of national professional organizations; and respondents to published announcements of the study.

An extensive review of the literature on reading programs was also conducted. This consisted primarily of a computer search of ERIC and SSIE documents and a review of previously published research studies that had identified successful programs.

A program information form (PIF) was developed for the purpose of assessing program effectiveness based on the established criteria. This form was sent to the director of each project identified by the PNF's and literature reviews. Information obtained from the responses to the PIF's was summarized into six categories related to indices of program effectiveness. Five of these categories were assigned a subscale score and the sixth (target population) was used for classification purposes only.

Each program was then rank-ordered according to its composite PIF score, with those achieving a minimal score of 30 being further reviewed. A final

set of programs was recommended to the Dissemination Review Panel (DRP) of the Office of Education for approval.

Criteria Used for Selecting Effective Programs

Criteria used to determine the effectiveness of the programs finally selected were: location within the U.S.; longevity of operational period; availability of program descriptions and evaluation reports since 1968; focus of evaluation data on cognitive gain and academic achievement; reliable and valid measures of program effectiveness; valid methods of assessing the effect of the program on its participants; evidence of generalization from the sample of participants to a specific target population; a sufficiently large sample size; educational and statistical significance of the effects of the program; and appropriateness of the program components for widespread dissemination.

Crawford, J. J., Kratochvil, D. W., & Wright, C. E. Evaluation of the impact of educational research and development products (AIR-21900-3/72-FR). Palo Alto, Calif.: American Institutes for Research, March 1972. (ERIC Document Reproduction Service No. ED 063 281)

General Description

This report describes a study, sponsored by the U.S. Office of Education, whose overall goal was to identify the factors involved in the impact of educational products. The specific objectives included: conducting systematic case studies of the development of selected educational products; providing empirical case study data relevant to current hypotheses about innovation in public school education; and listing those educational products judged as having substantial positive impact. Over 1,000 products were reviewed in the initial screening process and 117 were identified as meeting the initial selection criteria. Further criteria were applied in order to select about 20 products as "exemplars" from the pool of 117. The final selection resulted in a group of 21 diverse educational products. Systematic case studies were conducted on these 21, tracing the history of each from its origin to its diffusion and adoption. Generalizations were also extracted about the products, and were related to existing hypotheses regarding the processes of innovation and change in education.

Educational Programs Reviewed

This study considered all programs whose subject matter involved at least one of the five content areas of mathematics, science, social studies, language, and vocational education. Also included were those programs concerned with facilitating the learning process, rather than with any particular subject matter. Both types of programs represented a variety of sponsoring or funding agencies.

Target Population Served by the Programs Reviewed

The programs reviewed covered a variety of target populations at every level from kindergarten through twelfth grade.

Procedures Used for Identifying Effective Programs

Specific definitional and impact criteria concerning educational products were first developed and subsequently a product rating form was developed. Using these criteria as a guide, exemplary products were sought by two methods. The first included soliciting nominations from a panel of professionals in various areas of education. The second involved a literature search of documents available through ERIC, PACE, SSIE, and the libraries at Stanford University and AIR, as well as an examination of the findings of selected major educational surveys and previous research conducted by AIR. Following the initial identification of potential products, a conference of consultants was held to discuss the criteria for the final selection of products and the procedures for conducting the case studies. Selection of the 21 products was based on selected information compiled from previous studies, from descriptive reports, and from direct contact with the developers. This information was recorded on a Product Rating Form and Product Description Form which were maintained for each product included in the candidate pool.

Criteria Used for Selecting Effective Programs

The initial screening criteria focused on definition of the products (educationally important objectives, clear procedures, available information on their development and use) and on impact (use in a specified minimum number of schools, aimed at a substantial target population, designed for grades up to 12th in specified key subject areas, introduced within the last five years, and relatively well known). Final selection criteria dealt with extent of use and solid evidence of student gain. The ultimate selection was made by considering the following additional constraints: the desirability of representing equally each of the five specified content areas and three major types of developers; the attempt to include a variety of product formats and to cover the entire range of grade levels; and, as a tie-breaker consideration, the amount of product visibility or interest generated in the educational community.

Epstein, M. G., Margosches, E. H., Schrader, W. B., & Walton, W. W. Selection of products for focused dissemination (ETS PR-71-8). Princeton, New Jersey: Educational Testing Service, June 1971. (ERIC Document Reproduction Service No. ED 050 308)

General Description

This report describes a project referred to as the Product Evaluation Project (PEP), which was undertaken for the National Center for Educational Communication (NCEC) of the U.S. Office of Education. Educational products were reviewed, described for comparative purposes, analyzed according to certain criteria of effectiveness, and recommended for focused dissemination aimed at expediting their installation, where appropriate, in the nation's schools. Approximately 70 products were reviewed in the initial phases of the study and nine were recommended for dissemination.

Educational Programs Reviewed

Educational products reviewed in this study encompassed a wide range of academic areas and cross-disciplines. Attention was restricted, however, to products developed in USOE-sponsored programs, particularly those under the direction of the National Center for Educational Research and Development (NCERD).

Target Population Served by the Programs Reviewed

The search for successful products included those for all ages, educational levels, and target populations.

Procedures Used for Identifying Effective Programs

General criteria for the selection of effective educational products were first developed. Using these criteria as a guide, nominations and descriptions of exemplary products were solicited from program developers in various agencies of the Office of Education. Simultaneously, a product evaluation panel (Appraisal Panel) of eight members, representing a designated set of interest groups in the field of education, was appointed and assigned the task of establishing the specific criteria for the final selection of suitable products. The panel also confirmed one list of products for study in depth, and another to be set aside for further development. It made the final selection of those products to be recommended for dissemination. Information obtained from the descriptions of each nominated product was compiled, categorized, and summarized in the form of a product précis, which was used by the product evaluation panel in the completion of their tasks. Finally, site visits were made to obtain any necessary additional evaluative information on the products being considered for dissemination.

Criteria Used for Selecting Effective Programs

The criteria used were: product goals related to significant educational outcomes; effectiveness in accomplishing stated goals; extent to which product use places heavy demands on school resources; adoptability; and overall judgement of extent to which product deserved USOE dissemination support.

Far West Laboratory for Educational Research and Development. Educational programs that work. San Francisco, Calif.: Author, September 1975.

General Description

This report provides descriptions of a number of innovative educational programs that have been approved for dissemination by the Joint Dissemination Review Panel (DRP) of the Department of Health, Education, and Welfare. The 140 programs referenced in this report were all found to meet the criteria of success established by the DRP.

Educational Programs Reviewed

The educational programs reviewed were restricted to those developed out of programs supported by the Office of Education. They represent a wide range of subject-matter areas, and include process-oriented techniques.

Target Population Served by the Programs Reviewed

The search for successful programs involved all ages and target populations. In addition, several programs were directed toward persons functioning within the instructional process, from parents to administrators.

Procedures Used for Identifying Effective Programs

Procedures used for identifying effective programs were carried out in accordance with the guidelines of the Office of Education's Dissemination Review Panel (DRP). (The DRP is described in a memorandum from T. H. Bell, Commissioner of Education, Department of Health, Education and Welfare, dated November, 1974.) Initially, an OE program office submitted 12 copies of a "Form for Submitting Materials to the OE Dissemination Review Panel" to the chairman of the DRP for each nominated program, along with the official approval of the submission by the Deputy of the program office. This form provided general identifying information as well as detailed evaluative evidence for the effectiveness of the program seeking approval. The members of the DRP reviewed these program descriptions and subsequently met to vote on which programs met the criteria and hence were suitable for dissemination. All programs receiving a majority vote of the DRP were approved for dissemination.

Criteria for Selecting Effective Programs

The criteria used by the DRP to assess program evidence were: availability of pre- and posttreatment measures showing student (participant) gains; the educational and statistical significance of participant gains; the adequacy of the sample size; the stability and generalizability of participant gains demonstrated by multiple replications of the treatment; and the attribution of gains primarily to the program, as indicated by comparing participant performance with that of a control group, with scores from previous years, or with national norms. Other aspects of each project were also considered.

Foat, C. M. Selecting exemplary compensatory education projects for dissemination via project information packages. Los Altos, Calif.: RMC Research Corporation, August 1974. (ERIC Document Reproduction Service No. ED 099 456)

General Description

This report describes one phase of a study, sponsored by the U.S. Office of Education, whose general purpose was to select successful educational programs serving poor, underachieving students and to disseminate information about them in the form of project information packages. This report specifies the methodology used in the selection, and the rationale behind the final acceptance or rejection of individual candidate programs for packaging. Over 2,000 reports were reviewed in the initial screening process and six were selected for dissemination.

Educational Programs Reviewed

In this study, attention was focused on educational programs involving reading or mathematics, and formerly or currently supported by one of the agencies of the U.S. Office of Education. Excluded from the study were bilingual and Follow-Through programs, as well as those sponsored by the Bureau of Indian Affairs.

Target Population Served by the Programs Reviewed

The programs reviewed were for underachieving poor children in grades K through 12.

Procedures Used for Identifying Effective Programs

Prerequisite criteria for the selection of successful programs were first developed. Using these criteria as a guide, potential candidates were then solicited from various sources, including: a list provided by the U.S. Office of Education of projects which had been previously identified as exemplary; nominations from state and federal agencies; and suggestions from personal professional contacts. Detailed descriptive and evaluative information on all projects identified as meeting the screening criteria was sought from the directors or close affiliates of each. On the basis of this information, each program was subjected to a further in-depth review and analysis. The final stages of the selection process involved site visits to all programs surviving the screening, and approval by the USOE Dissemination Review Panel.

Criteria Used for Selecting Effective Programs

The criteria used were: relevance in terms of disadvantaged target population and focus on the subject areas of reading and/or mathematics; availability of evaluation information; start-up costs under $1,000 per pupil and recurring costs under $475; replicability; evidence of educationally and statistically significant effects on student achievement; current or previous support by USOE funds; and conformance to federal guidelines for projects so funded.

Gordon, E. W., & Brownell, C. R. Preparation of publications on progress in compensatory education and desegregation programs (Final report). New York: ERIC Clearinghouse on the Urban Disadvantaged, Columbia University, 1972. (ERIC Document Reproduction Service No. 099 458)

General Description

This is a report of a project supported by the National Institute of Education. It includes a description of the procedures used to identify and select programs exemplary of quality, progress, trends, or problems in compensatory education and school desegregation plans. Procedures leading to the preparation of brochures describing the features of the selected programs are also described. From a pool of 379 nominated programs, 12 were eventually selected as meeting all the necessary criteria.

Educational Programs Reviewed

This study considered programs representing a wide range of subject matter areas and sources of funding. However, only those of a compensatory nature or involving a school desegregation plan were eligible for consideration. A further restriction on the programs reviewed was their exclusion from previous publication in formal model program series.

Target Population Served by the Programs Reviewed

The search for exemplary programs included all ages and target populations.

Procedures Used for Identifying Effective Programs

General criteria for identifying effective programs were first developed. On the basis of these criteria, nominations of possible candidates were obtained from various regional, state, and federal personnel, experienced researchers in the field, university and/or state programs dealing with desegregation, and recommendations in the ERIC/IRCD Annual Review. More extensive information on all nominated programs was then requested of individual project directors. Once obtained, each program was evaluated and rated on the basis of specific criteria developed by the project staff and outlined in a rating sheet. This sheet provided a breakdown of each criterion into five levels, with a numerical weight assigned to each level. Final procedures included a field study of promising candidates, preparation of descriptive reports of the programs finally selected, and reporting to NIE.

Criteria Used for Selecting Effective Programs

Criteria used were: face validity of program; indications of positive change in the affective and social behaviors of pupils; indications of positive change in the academic achievement or level of intellective function of pupils; positive reactions of parents and community; replicability at other school sites; evidence of assessment of pupil needs as reflected in the program; evidence of program success in terms of its stated and/or implicit objectives; assurance of the willingness of local program personnel and administrators to cooperate in the effort; longevity of the project. Three additional criteria were applied to the desegregation projects: evidence of low conflict

or effective strategies for dealing with such conflict; amount of variety in academic and nonacademic activities; and evidence of local planning and efforts to meet the specific problems of desegregation in the school or community.

Hawkridge, D. G., Campeau, P. L., DeWitt, K. M., & Trickett, P. K. A study of further selected exemplary programs for the education of disadvantaged children (AIR-830-6/69-FR). Palo Alto, Calif.: American Institutes for Research, June 1969. (ERIC Document Reproduction Service No. ED 036 668)

General Description

This report describes a study done for the U.S. Office of Education in which successful compensatory education programs were identified, selected, analyzed and described. The final descriptions were intended to be concise accounts which might be used to facilitate program replication by local educational practitioners. In the initial phases of this study, which was a sequel to one conducted in 1968 (Hawkridge, Chalupsky, & Roberts, 1968), approximately 320 candidate programs were reviewed and 11 were eventually identified as successful.

Educational Programs Reviewed

In this study consideration was given to educational programs involving language arts or mathematics, and supported by any group or institution.

Target Population Served by the Programs Reviewed

The programs reviewed were restricted to those whose target populations were disadvantaged children from preschool age through twelfth grade.

Procedures Used for Identifying Effective Programs

General criteria for the selection of successful programs were first established. On the basis of these criteria, a large pool of candidate programs was developed by means of an extensive literature search involving ERIC documents. Mail and telephone inquiries directed to project directors and local education personnel were also made. Information on each program obtained by these procedures was classified and recorded on a draft description form developed to facilitate the collection of more specific information. Finally, site visits were made to all programs selected for in-depth study.

Criteria Used for Selecting Effective Programs

The chief criterion used in the selection of successful programs was that of demonstrated, statistically significant gains in the cognitive achievement of students as measured by standardized tests.

Hawkridge, D. G., Chalupsky, A. B., & Roberts, A. O. H. A study of selected exemplary programs for the education of disadvantaged children (AIR-752-9/68-FR). Palo Alto, Calif.: American Institutes for Research, September 1968. (ERIC Document Reproduction Service Nos. ED 023 776, ED 023 777)

General Description

This report describes a project undertaken for the U.S. Office of Education. Its objectives were to identify, select, analyze, and describe compensatory education programs showing measured benefits of cognitive achievement. Over 1,000 programs were initially identified for review, and 21 were selected as meeting the criteria of acceptability for large-scale replication.

Educational Programs Reviewed

The programs considered for review by this study were those classifiable under the heading of compensatory education, regardless of funding source. The subject matter stipulated for these programs included any aspect of the fields of language arts and/or mathematics.

Target Population Served by the Programs Reviewed

The target populations acceptable in this study included all culturally disadvantaged children from preschool through twelfth grade.

Procedures Used for Identifying Effective Programs

Initial procedures for selecting programs consisted of developing general criteria of effectiveness and conducting a literature search for programs meeting these criteria. The search involved ERIC, USOE, and SIE documents. Identification and statistical information on each program from the literature search was recorded on a special form. In addition, each program was evaluated on the basis of a specially developed two-way rating system having a classification component and one concerning program design.

Secondary procedures included: establishing additional criteria for the selection of programs to be visited; assembling a panel of national experts to designate, on the basis of the established criteria, those programs suitable for on-site visits; submitting a list of the eligible programs to USOE, the Carnegie Corporation, and the National Advisory Council on the Education of Disadvantaged Children for further recommendations; and on-site visits to the selected programs.

Criteria for Selecting Effective Programs

The final selection of successful programs for educating culturally disadvantaged children was based on the following criteria: availability of a clear description of the hypothesis being tested by the program; specification of the population to which the results were applicable; appropriate sample size; indication of the reference base from which any changes were measured; a statement of the instruments used and results obtained; valid methods of comparing results; evidence of the reliability and statistical significance of the results; and the importance of the gains brought about by the program.

U. S. Department of Health, Education and Welfare, Office of Education. Sharing educational success: A handbook for validation of educational practices. Washington, D.C.: Author, undated. (USOE Form 4552) (b)

General Description

This is a handbook compiled by the U.S. Office of Education. It outlines the procedures whereby successful educational practices or projects may be identified, approved for on-site validation, and described in order to encourage replication by the nation's public and nonprofit private schools. To date, approximately 260 projects have been validated as successful through the procedures specified in this handbook.

Educational Programs Reviewed

ESEA Title III projects in operation throughout the United States during 1972-73, 1973-74, and 1974-75.

Target Population Served by the Programs Reviewed

The search for successful projects covered all target populations served by ESEA Title III-funded schools.

Procedures Used for Identifying Effective Programs

The initial process for identifying outstanding projects involved nominations by individual State Education Agencies (SEA's) of projects meeting certain established criteria. Local educational agencies (LEA's) operating the identified projects were then notified and, if interest was expressed, they were sent copies of this handbook to use in submitting an "Application for Validation" form to the SEA along with any supporting evidence. The SEA reviewed and rated the submitted applications using a "State Rating and Review" form, and then nominated projects for on-site visits by trained out-of-state teams. The team members were nominated by their own state and were selected on the basis of their expertise in evaluating the specified criteria for validation and their knowledge of the content areas of specific projects. During the on-site visit, the team carried out a variety of activities necessary to their completion of an "On-Site Validation" form and rating of each project. Within two weeks from the time of the on-site visit, written reports and recommendations of each team member were compiled, edited, and written up in a "Validation Report" form by the team chairperson. The form was submitted to the SEA, which reviewed the "Validation Report," verified its accuracy, and forwarded it to the Chief State School Officer, who certified the suitability of the project for dissemination.

Criteria Used for Selecting Effective Programs

The criteria used were availability of: (a) statistical evidence of educationally significant learner gains; (b) sufficient information on program resources, operation, and management; and (c) information concerning the feasibility of replication of the project in other school districts.

Walton, W. W., Esser, B. F., Epstein, M. G., Margosches, E. H., & Schrader, W. B. Selection of exemplary educational products (ETS PR-73-11). Princeton, N. J.: Educational Testing Service, April 1973. (ERIC Document Reproduction Service No. ED 083 291)

General Description

This report gives an account of a comparative review of products undertaken in a study authorized by the National Institute of Education (NIE). The objectives of the study, which were the same as those of the Product Evaluation Project (PEP) of 1971, involved: identification of outstanding educational products for review; preparation of product descriptions which would facilitate comparative evaluation procedures; analysis of individual products on the basis of a set of internally evolved, goal-specific criteria; and selection of a group of exemplary products to be recommended to NIE for both its current and future dissemination programs. From a total of 190 products initially reviewed, 23 were selected as meeting all the criteria for dissemination.

Educational Programs Reviewed

This study considered educational products representing a broad range of academic fields and cross-disciplines. The funding and/or originating sources of these products included various programs of the National Center for Educational Research and Development of USOE, and the Bureau for the Education of the Handicapped. Also given prime consideration were the products recommended in an earlier study conducted by the American Institutes for Research, Evaluation of the Impact of Educational Research and Development Products (Crawford, Kratochvil, & Wright, 1972), and those designated in the PEP panel recommendations of 1971 (Epstein et al., 1971).

Target Population Served by the Programs Reviewed

The products reviewed were intended to be applicable to a wide variety of educational levels as well as to serve a diversity of socio-cultural populations.

Procedures Used for Identifying Effective Programs

Initial procedures for identifying effective programs involved the appointment of a panel of experts whose central tasks were to establish the selection criteria and the procedures for applying them in the study, and to serve as the final decision-making body for selecting those products most suitable for dissemination. Simultaneously, a pool of products meeting certain general criteria was formed. This process involved obtaining permission from the respective developers to include products identified previously, as well as soliciting nominations of other products from both previously and newly contacted developers. More specific information on the products in the pool was then obtained and recorded in a product précis which became part of a dossier containing all of the information on each product. Finally, the panel of experts reviewed the information, primarily the product précis, and, based on their established criteria, made selections of products suitable for dissemination.

Criteria Used for Selecting Effective Programs

As in the PEP study, the criteria used were: product's focus upon goals judged to be significant for education; sound evidence of product effectiveness; extent to which product places heavy demands on school's economic and human resources; adoptability; and overall desirability of product for inclusion in the pool of those recommended for dissemination.

Wargo, M. J., Campeau, P. L., & Tallmadge, G. K. Further examination of exemplary programs for educating disadvantaged children (AIR-2026-7/71-FR). Palo Alto, Calif.: American Institutes for Research, July 1971. (ERIC Document Reproduction Service No. ED 055 128)

General Description

This report describes the third in a series of studies conducted for the U.S. Office of Education. Its primary purpose was to identify successful compensatory education programs and subsequently provide detailed descriptions of each for publication by USOE. Other objectives of the study included: determining the current nature of the process of assessing noncognitive benefits as evidenced in the evaluations of successful programs; developing a simple index for cost-benefit comparisons based on a review of the budgets of successful programs; and ascertaining the extent to which the programs described in the two earlier studies have experienced continued success. Over 1,200 programs were reviewed and 10 were selected as meeting the criteria for success.

Educational Programs Reviewed

Considered in this study were all compensatory education programs encompassing any subject matter and sponsored by any group or institution.

Target Population Served by the Program Reviewed

The target population of those programs reviewed was restricted to disadvantaged children ranging in age or grade level from preschool through the twelfth grade.

Procedures Used for Identifying Effective Programs

Initial procedures for identifying effective programs involved the development of general criteria. Following this, possible program candidates were searched for in the documents available through ERIC, university-based Research and Development Centers, Regional Educational Laboratories, and the National Laboratory on Early Childhood Education. Other candidates were obtained by soliciting nominations from state departments of education and professional contacts. Documentation of each program identified by these procedures was requested of the chief personnel associated with each. Once documents were acquired, further screening of the identified programs took place to determine which were suitable for in-depth analysis. Finally, site visits were made to all programs not eliminated by any of the above procedures.

Criteria for Selecting Effective Programs

The criteria used in the final selection of successful educational programs included: location within the U.S.; available and recent documentation in sufficient quantity for evaluation purposes; appropriate target population; adequate sample selection; treatment focusing on cognitive improvement; reliable and valid measurement based on standardized tests of ability or achievement; a comparison base using national norms or a performance control group; proper statistical analysis; and statistically and educationally significant benefits demonstrated by the results.

APPENDIX B

LIST OF SUCCESSFUL INDIVIDUALIZED INSTRUCTION PROGRAMS

Academic Advancement Program (AAP), Morristown, New Jersey.

Andover's Individualized Reading System, Andover, Massachusetts.

Arithmetic Proficiency Training Program.

Bank Street College of Education Approach (Follow-Through), New York, New York.

Basic Skills in Reading, Manchester, New Hampshire.

Project Catch-Up, Newport Beach, California.

Project Catch Up-Keep Up (Formerly, Disadvantaged ESEA Title I Reading), Tucson, Arizona.

Clarkston Schools Remedial Reading Program, Clarkston, Michigan.

Classroom Intervention, Seattle, Washington

Classroom Team Approach Project, Adams County, Colorado.

Comprehensive Client-Centered Basic Skills and Staff Development Center (Project BASIC), Cedar Rapids, Iowa.

Conceptually Oriented Mathematics Program (COMP), Columbia, Missouri.

CONQUEST, East St. Louis, Illinois.

Continuous Progress Mathematics Program, Aurora, Colorado.

Corrective Reading, Newport, Rhode Island.

Criterion Reading Instructional Project, Linden, New Jersey.

Curriculum Change Through Nongraded Individualization, Blackfoot, Idaho.

Dale Avenue Project, Paterson, New Jersey.

Developmental Skills Centers, Greene, New York.

Diagnostic and Educational Learning Center for Children with Learning Problems, Des Moines, Iowa.

Diagnostic-Prescriptive Arithmetic (DPA) (Formerly, Mathematics Prescriptions for Classroom Teachers), Staten Island, New York.

Diagnostic Reading Clinic, Cleveland, Ohio.

Directed Learning Program, Hempstead, New York.

Elementary Reading Centers, Milwaukee, Wisconsin.

Espanola Reading Centers, Espanola, New Mexico.

Fernald School Remediation of Learning Disorders Programs, Los Angeles, California.

Florida State Tutorial Program for Migrant Children, Fort Lauderdale (Broward County), Florida.

Follow-Through - Portageville Unit, Portageville, Missouri.

Follow-Through, Richmond, Virginia.

Follow-Through, Trinidad, Colorado.

The Four R's: A Strategy for Self Directed Learning, Cullman, Alabama.

The Glassboro Right-to-Read Project, Glassboro, New Jersey.

Greater Cleveland Mathematics Program, Educational Research Council of America, Cleveland, Ohio.

Guggenheim Museum Children's Program: Learning to Read Through the Arts, New York, New York.

Hawaii English Program, State of Hawaii.

Help One Student to Succees (HOSTS), Vancouver, Washington.

High Intensity Learning System, Educational Systems Division, Random House, Inc., New York, New York.

High Intensity Tutoring (H.I.T.), Highland Park, Michigan.

Improvement of Basic Reading Skills, Sylacauga, Alabama.

Individualized Computational Skills Program, Houghton Mifflin Company, Iowa City, Iowa.

Individualized Early Learning Program (Follow-Through), Learning Research & Development Center, Pittsburgh, Pennsylvania.

Individualized Mathematics Program (IMP), Educational and Industrial Testing Service, San Diego, California.

Individualized Reading Instruction for Students (IRIS), Rapides Parish, Louisiana.

Individualizing Instruction in an Elementary School--Project PLAN, Winona, Minnesota.

Individualizing Instruction: Placing Learning Ahead of Teaching, Florence, South Carolina.

Individually Prescribed Elementary Instructional Program, Valdosta, Georgia.

Project INSTRUCT (Instructional System for Teaching Reading Using Continuous-Process Technology), Lincoln, Nebraska.

Intensive Reading Instructional Teams (IRIT), Hartford, Connecticut.

Jennings, Missouri, Learning Laboratory, Jennings, Missouri.

Project Learning Experience Module (LEM), Hackensack, New Jersey.

Project MATH, Behavioral Research Laboratories, Menlo Park, California.

Math Laboratories for Disadvantaged Students, Anderson County, South Carolina.

Mathemagenic Activities Program (MAP) (Follow-Through), Department of Psychology, University of Georgia, Athens, Georgia.

Matteson Four-Dimensional Reading Project, Matteson, Illinois.

Measurable Extensions to Reading, West Fargo, North Dakota.

Multi Resource Mathematics Management System (MRMMS), Glen Ridge, New Jersey.

Multiage Grouping in Early Childhood Education, San Diego, California.

New Adventure in Learning (NAIL), Leon County, Florida.

New Century Learning Center - Reading, New Century Education Corporation, New York, New York.

Project Open Classroom, Wayne, New Jersey.

Organizing Resources by Instructional Teams, Project ORBIT, Oberlin, Ohio.

PEGASUS-PACE: Continuous Progress Reading Program, Tuscaloosa, Alabama.

Project PLACE, Lynchburg, Virginia.

Programmed Tutorial Reading (PTR), Davis County, Utah.

PS 115 Alpha One Reading Program, New York, New York.

Project Read, Pittsburgh, Pennsylvania.

Project Reading Improvement, Burgaw, North Carolina.

Reading Instruction and Pupil Personnel Services (RIPPS), Portsmouth, Rhode Island.

Reading Laboratories, Dougherty County, Georgia.

Reading Project, Hilo, Hawaii.

Redesign for Mathematical Relevancy, East Syracuse, New York.

Reinforcing Personalized Instruction, Torrington, Wyoming.

Remedial Reading (Title I), Flagstaff, Arizona.

Remedial Reading Laboratories, El Paso, Texas.

Responsive Educational Program (Follow-Through), Far West Laboratory for Educational Research and Development, San Francisco, California.

SDR: Systems Directed Reading, Elkhart, Indiana.

Project SMART (Success in Mathematics Through Aural-Reading Techniques), Daytona Beach, Florida.

SRA Mathematics Learning System, Science Research Associates, Chicago, Illinois.

SRA Reading Laboratory Series, Science Research Associates, Chicago, Illinois.

Special Reading Program, Mishawaka, Indiana.

Project STAY (School to Aid Youth), Moore, Oklahoma.

Strategies in Early Childhood Education, Waupun, Wisconsin.

Project Success, Poulsbo, Washington.

Sullivan Individualized Language Arts System (SILAS), Behavioral Research Laboratories, Menlo Park, California.

A Systems Approach to Individualized Instruction, Grants Pass, Oregon.

Title I Corrective Reading, Wichita, Kansas.

Title I Reading Center Program (Also, Reading Center, Title I), Broward County, Florida.

Project Understand, Arlington, Massachusetts.

APPENDIX C

DATA ELEMENTS SHEETS AND ASSOCIATED NOTES

Name of program, location, and address:
(Note 1)

Description of Program

1. Study or studies selecting it as successful or effective:

2. Sources from which information about it was obtained (including date of source and year of operation described):

3. Whom to contact for additional information (include address and phone number):
(Note 2)

4. Year program came into use:
5. Original developers:

6. Funding source for original development (give Title if known):
____Federal ____State ____District ____Private ____Don't know
7. Sources of funds for program operation (give Title if appropriate):
____Federal ____State ____District ____Private ____Don't know
8. Costs for program operation (including materials and equipment). (Show costs per pupil per year when available, and date):
(Note 3)

9. Subject matter addressed: ____Reading (Note 4) Language Arts ____Math ____Science ____Social Studies ____Other
10. Grade levels intended for: PreK K 1 2 3 4 5 6 Other
11. Mode: ____Noncomputerized ____CMI ____CAI ____Don't know
12. Students using program (give Title if known): ____All ____Disadvantaged ____Low Achieving ____Handicapped ____Bilingual ____Don't know ____Other (specify): (Note 5)

13. Extent of use (number of students, classrooms, schools, or districts in which the program was used):
(Note 6)

14. Other major noninstructional elements of the program:
(Note 7)

15. Formal training for program operation required for: (Note 8)
(Note 9) Teacher (Note 10) Paraprofessionals ____Administrators ____Volunteers
____Don't know ____Other (specify):

16. Does the program require the services of a program director in addition to the instructional staff (one only): ____Yes ____No ____Don't know

17. Need for staff reorganization (one only): (Note 11)
____Yes ____No ____Don't know

18. Need for classroom modification (one only): (Note 12)
____No modifications needed ____Some needed ____Many needed
____Don't know ____Not applicable (room not used)

19. Special facilities and/or equipment needed (one only): (Note 13)
____Yes ____No ____Don't know

20. Amount of parent/community involvement in program operation (one only): (Note 14)
____None ____Some ____Much ____Don't know

21. Theoretical rationale behind program:
(Note 15)

Characteristics of Objectives

1. Stress or emphasis of program objectives or goals: (Note 16)
____Develop or extend academic skills
____Develop positive attitudes, self-concept
____Individual development as self-directed, independent learner
____Other (specify):

2. Characteristics of learner objectives (one only):
____Written (general) ____Written (specific) ____Not written
____Don't know

3. Origin of learner objectives: ____Developed by program (school) staff
____Adopted from another source ____Don't know

Diagnostic and Prescriptive Procedures (Note 17)

1. Student learner needs and requirements are determined by considering: (Note 18)

____Student aptitude ____Student achievement ____Student interest

____Student attitudes ____Student learning style ____Student aspirations

____Don't know ____Other (specify):

2. Primary sources of data on student learner needs and requirements:

____Criterion referenced achievement test

____Norm referenced achievement test

(Note 19) Other cognitive test

____Noncognitive test

____Student past performance

____Student past learning rate

____Student interview

____Teacher opinion

____Questionnaire (specify from whom):

____Don't know

____Other

3. Student learning needs or requirements are diagnosed primarily by:

____Student ____Teacher (Note 20) Team of teachers ____Parents

____Don't know ____Other (specify): (Note 21)

4. Frequency of diagnosis: ____Continuous or daily (Note 22) At beginning of each instructional unit ____At beginning of semester or school year

____Don't know ____Other (specify):

5. Student learning needs or requirements are diagnosed in order to: (Note 23)

(Note 24) Determine content for the student to study

(Note 25) Determine a series of instructional objectives for the student

(Note 26) Determine learning activities for the student

(Note 27) Determine learning materials for the student

(Note 22) Determine number of instructional units to be assigned the child

____Don't know

____Other (specify):

6. Who prescribes the instructional objectives and/or learning activities for each child?

____Student ____Teacher ____Team of teachers ____Don't know

____Other (specify):

7. Frequency of prescription of program of studies: ____Continuous or daily
____At beginning of each instructional unit ____At beginning of semester or school year ____Don't know ____Other (specify): (Note 28)

8. Is there a written individual plan or contract for each student (one only)?
____Yes (specify):
____No
____Don't know

Instructional Procedures and Materials

1. Attendance:
____Students who choose to attend
____All students of given age or grade level
(Note 29) ____All students identified by formal diagnostic procedure
(Note 30) ____All students classified in an identified subgroup
____All students in a school
____Don't know

2. How is this program used:
____For all instruction in the subject matter area
____For supplemental or remedial work
____For special projects
____For enrichment work
____Don't know

3. Period of student use (one only): ____School year ____Semester
____Less than semester (show number of days): ____Don't know
____Other (specify): (Note 31)

4. Frequency of instruction: ____As needed (student choice)
____As needed (teacher choice) (____) times per week ____Don't know
____Other (specify):

5. Length of instructional period (one only): (Note 32) Unspecified
(____) minutes per day or week (circle) ____Don't know

6. Time schedule: ____Unscheduled ____Scheduled
____Don't know (Note 33)

7. What is the instructional unit and what is the average length of time needed for a student to complete it? (Note 22) (Note 34)

8. An instructional unit is studied until (one only):
____All learning activities are finished
(Note 35) ____A specific mastery level is reached
____A specified amount of time passes
____Don't know
____Other (specify):

9. Is a student allowed to start a new instructional unit as soon as he completes the previous unit (one only)? ____Yes ____No ____Don't know

10. The amount of time in which an instructional unit is completed (pace) is (one only):

____Different for each student

____The same for a subgroup of students in the class

____The same for all students in the class

____Don't know

11. Are all students expected to eventually master the same instructional objectives or subject content (one only)? ____Yes (Note 36) No ____Don't know

12. Provision for alternate learning material for mastering a given instructional objective or subject content (one only): (Note 37) Yes ____No ____Don't know

13. Materials or equipment used: ____Only standard classroom texts

____Paper products (textbooks, workbooks, manuals, tests) (Note 38)

____Audio-visual ____Kits (incl. charts, games, models)

____Computer ____Don't know ____Other (specify):

14. Is there provision for student use of a wide range of learning materials (one only)? ____Yes ____No ____Don't know (Note 39)

15. Instructional area (learning space) used (one only): (Note 40)

____Typical classroom

____Center or laboratory (reading or mathematics)

____Room larger than typical classroom

____Don't know

____Other (specify):

16. Typical class size: (Note 41)

17. Class organization: (Note 42)

(Note 43) Students work independently

(Note 44) Students work independently with occasional guidance

(Note 45) Tutorial assistance (specify by whom):

(Note 46) Pupil teams

____Students work in small groups (2-5 students)

____Students work in large groups (over 5 students)

(Note 42) Whole class works together

18. Basis of grouping students within class: (Note 47) Achievement level

____Student interest ____Instructional unit being worked on

____Not applicable (no grouping) ____Don't know ____Other (specify):

19. Number of personnel required for typical class size (check if less than half): (____)Typical teachers (____)Reading or math specialists (____)Paraprofessional (____)Volunteers (____)Other personnel (including student tutors) (specify): (Note 49) ____Don't know (Note 48)

20. Degree and style of reinforcement or incentives (if any): (Note 50)

21. Record keeping is done by: ____Student ____Volunteer ____Paraprofessional ____Teacher or specialist ____Computer ____Don't know ____Other (specify): (Note 51)

Learner Evaluation and Assessment Procedures (assessment of student mastery) (Note 52)

1. Frequency of learner evaluation and assessment
   ____Continuous (daily) ____At end of each instructional unit
   ____At the end of each school semester ____Don't know
   ____Other (specify):
2. Source of data on learner evaluation and assessment:
   ____Subjective judgment (student, teacher, parents) without objective data
   ____Objective test data
   (Note 53) ____Other objective data (e.g., quality of work done, student performance)
   ____Don't know
   ____Other (specify):
3. Are results of learner evaluation also used for diagnostic purposes (one only): ____Yes ____No ____Sometimes ____Don't know

Program Evaluation (Note 54)

1. Tests used in program evaluation to assess effectiveness or success.

(Note 55) Test Name (Note 56)	Origin of Test: Prog. Dev.	Origin of Test: Publ. of Mat. Used	Origin of Test: Other Test Publ.	Origin of Test: Don't Know	Appropriateness: Appro.	Appropriateness: Maybe	Appropriateness: Inapp.	Appropriateness: Don't Know
1.	(Note 57)	(Note 58)	____	____	____	____	____	____
2.	____	____	____	____	____	____	____	____
3.	____	____	____	____	____	____	____	____
4.	____	____	____	____	____	____	____	____

2. Type of evidence reported for demonstrated cognitive benefits:

____PP-ST-C: pre and post standardized test measures with control group (Note 59)

____PP-ST: pre and post standardized test measures without control group

____PP-PT-C: pre and post program test measures (i.e., CRT or other measures or indicators of performance specified as evidence of attainment of the program objectives) with control group

____PP-PT: pre and post program test measures without control group

____P-PT-C: post only program test measures with control group

____P-PT: post only program test measures without control group

____Unspecified

(Note 60) No evidence reported

(Note 61) Not applicable (not purpose of program)

3. Evidence of cognitive gains: (Note 62)

____Was reported for one group of students over one school year or less

____Was reported for one group of students over more than one school year

(Note 63) Was reported for two or more groups of students over one school year or less

____Was reported for two or more groups of students over more than one school year

(Note 60) No evidence reported

(Note 61) Not applicable (not purpose of the program)

4. Type of evidence reported for demonstrated affective (noncognitive) benefits:

____PP-ST-C: pre and post standardized test measures with control group

____PP-ST: pre and post standardized test measures without control groups

____PP-PT-C: pre and post program test measures (i.e. CRT or other measures or indicators of performance specified as evidence of attainment of the program objectives) with control group

____PP-PT: pre and post program test measures without control group

____P-PT-C: post only program test measures with control group

____P-PT: post only program test measures without control group

____Unspecified

(Note 60) No evidence reported

(Note 61) Not applicable (not purpose of the program)

5. Evidence of affective (noncognitive) gains: (Note 62)

____Was reported for one group of students over one school year or less

____Was reported for one group of students over more than one school year

(Note 63) Was reported for two or more groups of students over one school year or less

____Was reported for two or more groups of students over more than one school year

(Note 60) No evidence reported (Note 61) Not applicable (not purpose of the program)

6. Other types (sources) of data reported to assess program effectiveness or success.

Type (source)	Yes or No	Appropriateness			
		Appro.	Maybe	Inappr.	Don't Know
Student Questionnaire	____	____	____	____	____
Student Interview	____	____	____	____	____
Teacher Rating of Students	____	____	____	____	____
Teacher Questionnaire	____	____	____	____	____
Teacher Interviews	____	____	____	____	____
Parent Questionnaire	____	____	____	____	____
Parent Interview	____	____	____	____	____
Classroom Observation (Checklist)	____	____	____	____	____
Other (specify)____	____	____	____	____	____

7. Concerns reported about: ____Demands on teacher time ____Inadequate teacher training ____Availability of appropriate instructional materials ____Costs ____No concerns reported ____Other (specify):

(Note 64)

Note 1: Two sets of sheets are to be used if the reading and mathematics components of a program differed significantly.

Note 2: The most recent information is to be recorded.

Note 3: When possible, record costs for the year of operation being described. Start-up costs are to be shown separately, if available. When known, note if per pupil costs included start up.

Note 4: All language arts except reading.

Note 5: "Students using program" is to be filled out in terms of the characteristics of the group of students using the program, or of the intended group of students. It may be difficult to differentiate disadvantaged from low achieving, which would include both disadvantaged and students who are not disadvantaged.

Note 6: All available extent of use information is to be noted using the must current information available.

Note 7: Noninstructional elements would include, for example, health and nutrition services.

Note 8: When available, also note the type and amount of training required.

Note 9: A teacher is defined as that credentialed person teaching or managing a class using the program being described. The teacher may supervise and not directly instruct students.

Note 10: A paraprofessional is a staff member who works alongside a professional staff member and assists him or her, but who does not have full professional status. For example, a teacher's aide.

Note 11: "Need for staff reorganization" is to be marked "Yes" if there was a change in organizational structure, "No" if there were just changes in individuals or just additions to a staff.

Note 12: Refers to physical modifications to the classroom, not just the rearrangement of things within the classroom.

Note 13: Exclude regular office equipment, but include unique or expensive equipment not ordinarily found in a typical classroom. Answer "Yes" if a separate classroom is needed.

Note 14: Answer in terms of the amount of involvement in program operation in the classroom.

Note 15: Restrict answer to information presented in the program material rather than inferring a rationale.

Note 16: Restrict answer to <u>stated</u> program objectives or goals.

Note 17: In the Diagnostic and Prescriptive Procedures section do not include

procedures for selecting students for the program unless they are clearly relevant to the operation of the program.

Note 18: Student learner needs and requirements are what is diagnosed.

Note 19: For example, intelligence tests.

Note 20: A formal team, not just different teachers.

Note 21: The "Other" category includes reading and mathematics specialists.

Note 22: An instructional unit is composed of or covers some number of instructional objectives (see also Note 25). It might be a lesson, lesson sequence, module, book, series of books, etc., as defined by the program. It may be the smallest unit defined by the program. It is that unit of instruction between a pretest and a posttest covering the same instructional objectives, if there are such tests.

Note 23: The intent of this data element is to get at why a student is diagnosed. Diagnosis at the start of an instructional unit is implied. A response alternative cannot be marked for this data element unless the program provides for alternatives for what is to be marked.

Note 24: Content is the same as topic. For example, is the student diagnosed to determine whether he is to study measurement or computation?

Note 25: An instructional objective may be called a skill. Assume that there are always instructional objectives, whether or not they are written or specified. The purpose of the diagnosis would be, for example, so that the student does not have to study instructional objectives that he has already mastered.

Note 26: Learning activities are the instructional techniques (approach, methods) used for, or by, the student.

Note 27: Learning materials are tangible resources, and include both supplies and equipment.

Note 28: The answer should be given in terms of the work assigned at a given time. A program of studies is prescribed on the basis of the diagnosis. A program of studies is a course of studies or a sequence of instructional objectives assigned to an individual student at a given time.

Note 29: For example, all students more than two years below grade level.

Note 30: For example, Follow-Through students.

Note 31: Do not report more than one school year.

Note 32: That is, a range of times which varies for individual students.

Note 33: Refers to the time of day that the student "goes to" the program.

Note 34: The average length of time needed for a student to complete an instructional unit may be difficult to determine from typical program material.

Note 35: Refers to a mastery level specified by the program, and usually does not require that all items are answered correctly.

Note 36: This element should be answered in terms of expectations for the student in this specific program, not in terms of all instruction received. The answer is "No" if the program has alternative series of objectives, such as measurement and computation, and a student does not have to study all of them.

Note 37: Refers to a variety of materials, not level or difficulty.

Note 38: Include all required materials used by students and instructional personnel.

Note 39: Refers to level or difficulty of the materials, not variety.

Note 40: An instructional area or learning space is a room or other area which was specifically designed, or adapted, to accommodate some form of instructional activity and is available for such purposes.

Note 41: Class: one or more students assigned to one or more teachers or other staff members for a given period of time for instruction or other learning activities in a situation where the teacher(s) and the student(s) are in the presence of each other. Note that a class can have one child in it, such as in the tutor situation. But a student working on his own in independent study is not a class. The class of concern is the class using the program being described, not some other reading or mathematics class or the student's home room class.

Note 42: For the class noted in element IPM-16, above.

Note 43: Students work primarily independently with infrequent guidance.

Note 44: Students work independently but receive occasional guidance from the teacher as needed.

Note 45: May include peer tutoring.

Note 46: Only mark pupil teams if the program materials use the term. Otherwise, use "Small Groups."

Note 47: This element refers to the grouping for instructional purposes noted in element IPM-17. "Achievement level" means general achievement level rather than more specific learner need.

Note 48: This element is to be completed for the typical class size recorded for element IPM-16. See also Notes 9 and 10.

Note 49: Do not include the project director or his secretary.

Note 50: Include anything that is rewarding to the student if it is emphasized by the program and purposely included.

Note 51: Note those primarily involved in record keeping.

Note 52: This section is concerned with the assessment of student mastery of previously assigned instructional objectives before additional instruction is given. Do not include procedures for determining whether a student should no longer be in the program.

Note 53: Objective data other than test data. Student performance may include, for example, reading out loud.

Note 54: Use any of the data employed by an evaluation to determine that this program is a success.

Note 55: Show both cognitive and noncognitive tests, up to four. If more than four tests were used, record four representative ones.

Note 56: Show also the grades to which the test was administered, and the school year.

Note 57: Program developed.

Note 58: Publisher of materials used by the program.

Note 59: Experimental and control groups need not be matched.

Note 60: Refers to test evidence.

Note 61: Not a purpose of the program as recorded in element CO-1, stress or emphasis of program objectives or goals.

Note 62: Each grade level can be considered a separate "group."

Note 63: The data need not necessarily be for the same school year for each group.

Note 64: Give reported negative side effects, and concerns reported about the program as it was operating.

APPENDIX D

SUPPLEMENTARY TABLES

The following tables are included in this appendix:

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Table D-1

Number of Individualized Programs Selected from Each Evaluation Study

Study	All Reading Programs		All Mathematics Programs		All Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Freq.	Percent (N=116)
Bowers et al., 1974	6	8.1	0	.0	6	5.2
Crawford et al., 1972	3	4.1	2	4.8	5	4.3
Epstein et al., 1971	0	.0	0	.0	0	.0
FWL, 1975	36	48.6	11	26.2	47	40.5
Foat, 1974	5	6.8	2	4.8	7	6.0
Gordon et al., 1972	5	6.8	5	11.9	10	8.6
Hawkridge et al., 1968	2	2.7	0	.0	2	1.7
Hawkridge et al., 1969	1	1.4	0	.0	1	0.9
USDHEW, undated	28	37.8	22	52.4	50	43.1
Walton et al., 1973	0	.0	0	.0	0	.0
Wargo et al., 1971	4	5.4	1	2.4	5	4.3
Popular Program	8	10.8	9	21.4	17	14.7

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program may have been identified from more than one study.

Table D-2

Year Programs Came Into Use

Year	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
1957	1	1.4	0	.0	.0	.0	.0	.0
1964	1	1.4	0	.0	4.8	.0	.0	.0
1965	5	6.8	0	.0	4.8	25.0	.0	.0
1966	11	14.9	4	9.5	4.8	12.5	7.7	.0
1967	1	1.4	1	2.4	.0	.0	.0	.0
1968	4	5.4	6	14.3	19.0	.0	30.8	.0
1969	5	6.8	4	9.5	9.5	.0	15.4	.0
1970	11	14.9	11	26.2	28.6	12.5	30.8	.0
1971	23	31.1	10	23.8	23.8	25.0	15.4	.0
1972	9	12.2	4	9.5	.0	12.5	.0	20.0
1973	2	2.7	0	.0	4.8	.0	.0	20.0
1974	0	.0	1	2.4	.0	12.5	.0	20.0
Unknown	1	1.4	1	2.4	.0	.0	.0	40.0

Table D-3

Original Program Developers

Program Developer	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
School, District, or Program Staff	57	77.0	27	64.3	57.1	87.5	38.5	100.0
State, University or R&D Center Staff	9	12.2	6	14.3	28.6	.0	38.5	.0
Commercial Organization	8	10.8	9	21.4	14.3	12.5	23.1	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Table D-4

Source of Funds for Original Program Development

Source of Funds	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Federal	53	71.6	27	64.3	81.0	62.5	76.9	80.0
State	2	2.7	1	2.4	.0	.0	.0	.0
District	5	6.8	2	4.8	4.8	25.0	7.7	.0
Private	4	5.4	5	11.9	4.8	.0	.0	.0
Federal and State	3	4.1	0	.0	.0	.0	.0	.0
Federal and District	3	4.1	5	11.9	4.8	.0	7.7	20.0
Federal and Private	2	2.7	0	.0	.0	12.5	.0	.0
Other	2	2.7	2	4.8	4.8	.0	7.7	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

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Table D-5

Source of Funds for Program Operation

Source of Funds	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Federal	47	63.5	22	52.4	71.4	87.5	69.2	80.0
State	2	2.7	1	2.4	.0	.0	.0	.0
District	5	6.8	8	19.0	4.8	.0	.0	.0
Private	0	.0	0	.0	.0	.0	.0	.0
Federal and State	5	6.8	1	2.4	9.5	.0	7.7	.0
Federal and District	12	16.2	9	21.4	14.3	.0	23.1	20.0
Federal and Private	1	1.4	0	.0	.0	12.5	.0	.0
Other	2	2.7	1	2.4	.0	.0	.0	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Table D-6

Subject Matter Addressed by Programs

Subject Matter	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Reading	74	100.0	25	59.5	100.0	100.0	92.3	40.0
Language Arts	23	31.1	16	38.1	52.4	12.5	69.2	20.0
Mathematics	25	33.8	42	100.0	57.1	25.0	100.0	100.0
Science	6	8.1	6	14.3	19.0	.0	30.8	.0
Social Studies	6	8.1	6	14.3	19.0	.0	30.8	.0
Other	8	10.8	6	14.3	19.0	12.5	30.8	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program may address more than one subject matter.

Table D-7

Grade Levels for Which Programs are Intended

Grade Level	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Prekindergarten	7	9.5	4	9.5	19.0	.0	23.1	.0
Kindergarten	34	45.9	25	59.5	76.2	.0	92.3	.0
Grade 1	55	74.3	33	78.6	95.2	.0	100.0	.0
Grade 2	61	82.4	35	83.3	85.7	.0	100.0	.0
Grade 3	61	82.4	36	85.7	76.2	.0	92.3	.0
Grade 4	51	68.9	25	59.5	.0	75.0	.0	20.0
Grade 5	45	60.8	25	59.5	.0	87.5	.0	60.0
Grade 6	41	55.4	24	57.1	.0	100.0	.0	100.0
Above Grade 6	26	35.1	16	38.1	.0	87.5	.0	80.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program usually spans a number of grades.

Table D-8

Types of Students Using the Programs

Type of Student	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
All Students	27	36.5	25	59.5	28.6	37.5	23.1	60.0
Disadvantaged or Low Achieving	43	58.1	15	35.7	66.7	62.5	69.2	40.0
Handicapped	1	1.4	0	.0	.0	.0	.0	.0
Other	5	6.8	3	7.1	9.5	.0	15.4	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program may be for more than one type of student.

Table D-9

Extent of Use of Programs

Extent of Use	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
No. of Students								
Under 100	5	6.8	2	4.8	9.5	.0	7.7	.0
100-499	26	35.1	13	31.0	42.9	37.5	30.8	80.0
500-999	16	21.6	9	21.4	14.3	50.0	23.1	.0
1,000-2,999	12	16.2	4	9.5	4.8	.0	7.7	20.0
3,000-9,999	8	10.8	10	23.8	23.8	.0	30.8	.0
10,000 or Over	4	5.4	1	2.4	.0	.0	.0	.0
Unknown	3	4.1	3	7.1	4.8	12.5	.0	.0
No. of Schools								
1	14	18.9	12	28.6	23.8	.0	23.1	40.0
2-5	16	21.6	6	14.3	14.3	25.0	7.7	40.0
6-10	11	14.9	6	14.3	.0	12.5	.0	.0
11-20	7	9.5	3	7.1	19.0	.0	15.4	.0
21 or Over	11	14.9	3	7.1	19.0	37.5	15.4	.0
Unknown	15	20.3	12	28.5	23.8	25.0	38.5	20.0

(Table continued on next page)

Table D-9 (Continued)

Extent of Use of Programs

Extent of Use	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
No. of Districts								
1	52	70.3	26	61.9	57.1	87.5	46.2	100.0
2-5	2	2.7	4	9.5	4.8	.0	7.7	.0
6 or Over	7	9.5	7	16.7	19.0	.0	30.8	.0
Unknown	13	17.6	5	11.9	19.0	12.5	15.4	.0

Note. Although the most current extent of use was recorded when available, the corresponding years range from 1967 through 1976.

Table D-10

Types of Individuals Requiring Formal Training for Program Operation

Type of Individual	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Teachers	64	86.5	38	90.5	95.2	87.5	100.0	100.0
Paraprofessionals	34	45.9	18	42.9	42.9	12.5	53.8	40.0
Administrators	12	16.2	8	19.0	19.0	37.5	23.1	60.0
Volunteers	5	6.8	1	2.4	4.8	.0	.0	.0
Others	8	10.8	6	14.3	14.3	12.5	7.7	20.0
Unknown	2	2.7	0	.0	.0	12.5	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since training may be required for more than one type of individual.

Table D-11

Need for Classroom Modification

Need for Modification	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
None Needed	56	75.7	33	78.6	85.7	50.0	76.9	80.0
Some Needed	14	18.9	6	14.3	4.8	37.5	7.7	20.0
Many Needed	3	4.1	3	7.1	9.5	.0	15.4	.0
Room Not Used	1	1.4	0	.0	.0	.0	.0	.0
Unknown	0	.0	0	.0	.0	12.5	.0	.0

Table D-12

Amount of Parent/Community Involvement in Program Operation

Amount of Involvement	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
None	32	43.2	20	47.6	23.8	62.5	7.7	80.0
Some	25	33.8	11	26.2	28.6	25.0	23.1	20.0
Much	16	21.6	11	26.2	47.6	12.5	69.2	.0
Unknown	1	1.4	0	.0	.0	.0	.0	.0

Table D-13

Stress or Emphasis of Program Objectives or Goals

Stress or Emphasis	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Develop or Extend Academic Skills	74	100.0	42	100.0	100.0	100.0	100.0	100.0
Develop Positive Attitudes, Self-Concept	34	45.9	21	50.0	52.4	62.5	61.5	20.0
Individual Development as Self-Directed, Independent Learner	11	14.9	10	23.8	14.3	12.5	23.1	20.0
Other	6	8.1	2	4.8	9.5	12.5	15.4	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program may have more than one stress or emphasis.

Table D-14

Characteristics of Learner Objectives

Characteristic	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Written General	12	16.2	6	14.3	19.0	25.0	23.1	20.0
Written Specific	54	73.0	33	78.6	76.2	62.5	76.9	60.0
Not Written	5	6.8	2	4.8	4.8	.0	.0	.0
Unknown	3	4.1	1	2.4	.0	12.5	.0	20.0

Table D-15

Origin of Learner Objectives

Origin	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Developed by Program Staff	52	70.3	30	71.4	71.4	62.5	84.6	80.0
Adopted from Another Source	17	23.0	8	19.0	33.3	.0	15.4	.0
Unknown	7	9.5	4	9.5	.0	37.5	.0	20.0

Note. Percents do not necessarily add to 100 nor frequencies to the corresponding N since learner objectives may have more than one origin.

Table D-16

Factors Considered in Determining Student Learning Needs and Requirements

Factor	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Student Aptitude	10	13.5	5	11.9	19.0	12.5	23.1	20.0
Student Achievement	73	98.6	41	97.6	100.0	100.0	100.0	100.0
Student Interest	13	17.6	8	19.0	19.0	12.5	30.8	.0
Student Attitudes	5	6.8	1	2.4	9.5	12.5	7.7	.0
Student Learning Style	12	16.2	6	14.3	19.0	12.5	30.8	.0
Student Aspirations	0	.0	0	.0	.0	.0	.0	.0
Other	4	5.4	4	9.5	9.5	.0	15.4	.0
Unknown	1	1.4	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since more than one factor may be considered in determining student learner needs and requirements.

Table D-17

Primary Sources of Data on Student Learning Needs and Requirements

Source of Data	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
Criterion Referenced Achievement Test	52	70.3	31	73.8	57.1	75.0	46.2	100.0
Norm Referenced Achievement Test	21	28.4	11	26.2	19.0	62.5	23.1	60.0
Other Cognitive Test	12	16.2	4	9.5	23.8	12.5	23.1	.0
Noncognitive Test	3	4.1	1	2.4	9.5	12.5	7.7	.0
Student Past Performance	33	44.6	12	28.6	42.9	50.0	46.2	20.0
Student Past Learning Rate	0	.0	0	.0	.0	.0	.0	.0
Student Interview	2	2.7	1	2.4	4.8	.0	7.7	.0
Teacher Opinion	16	21.6	10	23.8	33.3	12.5	46.2	.0
Questionnaire	0	.0	0	.0	.0	.0	.0	.0
Other	10	13.5	4	9.5	9.5	25.0	15.4	20.0
Unknown	1	1.4	0	.0	.0	12.5	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since data on student learner needs and requirements may come from more than one source.

Table D-18

Individual Who Diagnoses Student Learning Needs or Requirements

Individual	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-5 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Student	1	1.4	2	4.8	.0	.0	.0	.0
Teacher	58	78.4	37	88.1	81.0	75.0	84.6	100.0
Team of Teachers	12	16.2	5	11.9	14.3	12.5	23.1	.0
Parents	1	1.4	1	2.4	4.8	.0	7.7	.0
Other (Specialist, etc.)	13	17.6	5	11.9	19.0	12.5	15.4	.0
Unknown	1	1.4	0	.0	.0	12.5	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since more than one individual may diagnose student learner needs or requirements.

Table D-19

Frequency of Diagnosis of Student Learning Needs or Requirements

Frequency of Diagnosis	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Continuous or Daily	20	27.0	9	21.4	38.1	37.5	23.1	40.0
At Beginning of Each Instructional Unit	32	43.2	21	50.0	33.3	12.5	46.2	40.0
Weekly	4	5.4	0	.0	.0	.0	.0	.0
At Beginning of Semester or School Year	33	44.6	20	47.6	33.3	75.0	53.8	80.0
Other	7	9.5	6	14.3	4.8	12.5	.0	.0
Unknown	4	5.4	1	2.4	4.8	12.5	7.7	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since student learning needs or requirements may be diagnosed at more than one time.

Table D-20

Reasons Why Student Learning Needs or Requirements Are Diagnosed

Reason	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Determine Content to be Studied	1	1.4	1	2.4	.0	.0	.0	.0
Determine Series of Instructional Objectives	57	77.0	33	78.6	71.4	75.0	61.5	100.0
Determine Learning Activities	40	54.1	23	54.8	61.9	62.5	76.9	40.0
Determine Learning Materials to Use	22	29.7	9	21.4	23.8	37.5	23.1	20.0
Determine Number of Units to Assign	0	.0	0	.0	.0	.0	.0	.0
Other	6	8.1	1	2.4	.0	12.5	.0	.0
Unknown	1	1.4	1	2.4	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since learning needs or requirements may be diagnosed for more than one reason.

Table D-21

Individual Who Prescribes the Instructional Objectives and/or Learning Activities for the Student

Individual	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Student	9	12.2	10	23.8	23.8	.0	30.8	.0
Teacher	59	79.7	38	90.5	81.0	75.0	84.6	100.0
Team of Teachers	8	10.8	3	7.1	9.5	12.5	15.4	.0
Other	12	16.2	6	14.3	19.0	.0	15.4	.0
Unknown	2	2.7	0	.0	.0	12.5	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since more than one individual may prescribe.

Table D-22

Frequency of Prescription of Programs of Studies

Frequency	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Continuous or Daily	28	37.8	13	31.0	47.6	50.0	38.5	40.0
At Beginning of Each Instructional Unit	27	36.5	18	42.9	23.8	12.5	30.8	60.0
Weekly	9	12.2	3	7.1	9.5	25.0	15.4	40.0
At Beginning of Semester or School Year	5	6.8	4	9.5	9.5	12.5	7.7	.0
Other	6	8.1	5	11.9	9.5	12.5	7.7	.0
Unknown	4	5.4	2	4.8	4.8	12.5	7.7	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program of studies may be prescribed at more than one time.

Table D-23

Which Students Attend

Students Who Attend	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Those Who Choose To	2	2.7	1	2.4	.0	25.0	.0	20.0
All of Given Age or Grade Level	24	32.4	18	42.9	38.1	50.0	30.8	60.0
All Identified by Formal Diagnostic Procedure	35	47.3	9	21.4	33.3	50.0	23.1	40.0
All Classified in an Identified Subgroup	7	9.5	6	14.3	28.6	.0	46.2	.0
All in a School	9	12.2	9	21.4	.0	.0	.0	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since students from more than one group may attend.

Table D-24

Program Attendance by Typical Class Size for All Reading Programs

Attendance	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
Those Who Choose to Attend	0	0	1	0	1	0	0	0	0	2
All of Given Grade Level	0	0	1	2	4	12	1	3	1	24
All Identified by Diagnosis	5	13	9	4	2	1	0	0	1	35
All Classified in a Subgroup	1	0	0	0	4	1	0	0	1	7
All in a School	0	0	0	0	5	3	0	1	0	9
Unknown	0	0	0	0	0	0	0	0	0	0
Sum	6	13	11	6	16	17	1	4	3	77

Note. Total number is 77 instead of 74, because three programs had two responses marked for program attendance.

Table D-25

Program Attendance by Typical Class Size for All Mathematics Programs

Attendance	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
Those Who Choose to Attend	0	0	0	0	1	0	0	0	0	1
All of Given Grade Level	1	0	0	2	4	7	1	3	0	18
All Identified by Diagnosis	0	2	1	2	3	1	0	0	0	9
All Classified in a Subgroup	0	0	0	0	4	1	0	0	1	6
All in a School	0	0	0	0	4	4	0	0	1	9
Unknown	0	0	0	0	0	0	0	0	0	0
Sum	1	2	1	4	16	13	1	3	2	43

Note. Total number is 43 instead of 42, because one program had two responses marked for program attendance.

Table D-26

How the Individualized Programs Are Used

How Used	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
All Instruction in the Subject Matter Area	39	52.7	33	78.6	66.7	25.0	76.9	80.0
Supplemental or Remedial Work	37	50.0	9	21.4	33.3	75.0	23.1	20.0
Special Projects	0	.0	0	.0	.0	.0	.0	.0
Enrichment Work	1	1.4	0	.0	.0	.0	.0	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not necessarily add to 100 nor frequencies to the corresponding N since a program may be used more than one way.

Table D-27

Program Attendance by Program Use for All Reading Programs

Attendance	Program Use: All Instruction in the Subject Area	Supplemental or Remedial Work	Special Projects	Enrichment Work	Unknown	Sum
Those Who Choose to Attend	0	2	0	0	0	2
All of Given Grade Level	22	3	0	0	0	25
All Identified by Diagnosis	3	33	0	1	0	37
All Classified as Subgroup	6	1	0	0	0	7
All in a School	8	1	0	0	0	9
Unknown	0	0	0	0	0	0
Sum	39	40	0	1	0	80

Note. Total number is 80 instead of 74 because three programs had two responses marked for program attendance and three programs had two responses marked for program use.

Table D-28

Program Attendance by Program Use for All Mathematics Programs

Attendance	Program Use					
	All Instruction in the Subject Area	Supplemental or Remedial Work	Special Projects	Enrichment Work	Unknown	Sum
Those Who Choose to Attend	1	0	0	0	0	1
All of Given Grade Level	16	2	0	0	0	18
All Identified by Diagnosis	2	7	0	0	0	9
All Classified as a Subgroup	6	0	0	0	0	6
All in a School	9	0	0	0	0	9
Unknown	0	0	0	0	0	0
Sum	34	9	0	0	0	43

Note. Total number is 43 instead of 42 because two responses were marked for program attendance for a program.

Table D-29

How the Individualized Reading Programs Were Used by Typical Class Size

Program Use	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
All Instruction in the Subject Area	0	0	0	4	13	16	1	4	1	39
Supplemental or Remedial Work	5	13	10	2	3	2	0	0	2	37
Special Projects	0	0	0	0	0	0	0	0	0	0
Enrichment Work	0	0	0	0	0	1	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0	0
Sum	5	13	10	6	16	19	1	4	3	77

Note. Total number exceeds 74, because three programs had two responses marked for program use.

Table D-30

How the Individualized Mathematics Programs Were Used by Typical Class Size

Program Use	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
All Instruction in the Subject Area	0	0	0	3	12	12	1	3	2	33
Supplemental or Remedial Work	1	2	1	1	3	1	0	0	0	9
Special Projects	0	0	0	0	0	0	0	0	0	0
Enrichment Work	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0
Sum	1	2	1	4	15	13	1	3	2	42

Table D-31

Frequency of Instruction

Frequency of Instruction	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Times Per Week								
2	2	2.7	0	.0	9.5	.0	.0	.0
3	2	2.7	0	.0	.0	12.5	.0	.0
4	6	8.1	1	2.4	.0	12.5	.0	20.0
5	59	79.7	39	92.9	85.7	75.0	92.3	80.0
8	1	1.4	1	2.4	.0	.0	.0	.0
Unknown	4	5.4	1	2.4	4.7	.0	7.7	.0
As Needed, Student Choice	1	1.4	1	2.4	.0	.0	.0	.0
As Needed, Teacher Choice	1	1.4	1	2.4	.0	.0	.0	.0
Varies Based on Need	2	2.7	1	2.4	.0	.0	.0	.0
Other Frequency	1	1.4	0	.0	.0	.0	.0	.0
Unknown	1	1.4	0	.0	.0	.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since more than one response was appropriate for some programs.

Table D-32

Length of the Instructional Period

Length	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Minutes Per Day								
0-15	5	6.8	5	11.9	9.5	12.5	7.7	20.0
16-30	10	13.5	4	9.5	14.3	12.5	7.7	.0
31-45	13	17.6	6	14.3	9.5	12.5	15.4	.0
46-60	15	20.3	10	23.8	9.5	37.5	7.7	60.0
61-90	6	8.1	2	4.8	4.8	12.5	7.7	.0
Over 90	8	10.8	0	.0	14.3	12.5	.0	.0
Length Unspecified	6	8.1	5	11.9	14.3	.0	23.1	.0
Length Varies	2	2.7	1	2.4	4.8	.0	7.7	.0
Other	0	.0	0	.0	.0	.0	.0	.0
Unknown	9	12.2	9	21.4	19.0	.0	23.1	20.0

Table D-33

Number of Minutes of Instruction Per Week

Minutes Per Week	Reading Programs						Mathematics Programs					
	All Programs		Used for All Instruction		Used for Supplemental Work		All Programs		Used for All Instruction		Used for Supplemental Work	
	Freq.	Percent (N=74)	Freq.	Percent (N=39)	Freq.	Percent (N=35)	Freq.	Percent (N=42)	Freq.	Percent (N=33)	Freq.	Percent (N=9)
0-50	0	.0	0	.0	0	.0	1	2.4	0	.0	1	11.1
51-100	7	9.5	1	2.6	6	17.1	5	11.9	1	3.0	4	44.4
101-150	9	12.2	5	12.8	4	11.4	2	4.8	2	6.1	0	.0
151-200	4	5.4	0	.0	4	11.4	1	2.4	1	3.0	0	.0
201-250	15	20.3	7	17.9	8	22.9	12	28.6	10	30.3	2	22.2
251-300	8	10.8	4	10.3	4	11.4	4	9.5	4	12.1	0	.0
301-350	0	.0	0	.0	0	.0	0	.0	0	.0	0	.0
351-400	2	2.7	1	2.6	1	2.9	2	4.8	1	3.0	1	11.1
401-450	5	6.8	5	12.8	0	.0	0	.0	0	.0	0	.0
Over 450	5	6.8	3	7.7	2	5.7	0	.0	0	.0	0	.0
Unknown	19	25.7	13	33.3	6	17.1	15	35.7	14	42.4	1	11.1

Note. Table shows number of minutes of instruction per week for all reading and mathematics programs, for programs used for all instruction in the subject matter area, and for programs used for supplemental or remedial work.

Table D-34

Number of Minutes of Instruction Per Week by Typical Class Size for All Reading Programs

	Typical Class Size									
Minutes Per Week	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
0-50	0	0	0	0	0	0	0	0	0	0
51-100	1	1	1	1	3	0	0	0	0	7
101-150	0	2	2	1	2	2	0	0	0	9
151-200	1	3	0	0	0	0	0	0	0	4
201-250	1	3	3	1	2	3	1	1	0	15
251-300	0	2	1	0	1	3	0	0	1	8
301-350	0	0	0	0	0	0	0	0	0	0
351-400	0	1	0	0	1	0	0	0	0	2
401-450	0	0	0	0	1	3	0	1	0	5
Over 450	0	0	1	0	1	1	[illegible]	1	1	5
Unknown	2	1	2	3	4	5	0	1	1	19
Sum	5	13	10	6	15	17	1	4	3	74

Table D-35

Number of Minutes of Instruction Per Week by Typical Class Size
for All Mathematics Programs

	Typical Class Size									
Minutes Per Week	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
0-50	0	0	0	0	1	0	0	0	0	1
51-100	1	0	0	1	3	0	0	0	0	5
101-150	0	0	0	0	2	0	0	0	0	2
151-200	0	0	0	0	0	1	0	0	0	1
201-250	0	1	0	0	3	5	1	2	0	12
251-300	0	0	0	0	1	1	0	1	1	4
301-350	0	0	0	0	0	0	0	0	0	0
351-400	0	1	0	0	1	0	0	0	0	2
401-450	0	0	0	0	0	0	0	0	0	0
Over 450	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	1	3	4	6	0	0	1	15
Sum	1	2	1	4	15	13	1	3	2	42

Table D-36

How the Completion of an Instructional Unit Is Determined

Studied Until	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
All Learning Activities Are Finished	6	8.1	6	14.3	9.5	12.5	7.7	20.0
A Specific Mastery Level is Reached	59	79.7	30	71.4	71.4	62.5	61.5	80.0
A Specific Amount of Time Passes	2	2.7	1	2.4	4.8	.0	7.7	.0
Other	3	4.1	2	4.8	4.8	12.5	7.7	.0
Unknown	4	5.4	3	7.1	9.5	12.5	15.4	.0

Table D-37

How The Amount of Time In Which An Instructional Unit Is Completed Varies

How Varies	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
Different for Each Student	59	79.7	33	78.6	81.0	62.5	76.9	100.0
The Same for a Subgroup of Students	9	12.2	7	16.7	14.3	.0	15.4	.0
The Same for All Students in the Class	2	2.7	0	.0	.0	25.0	.0	.0
Unknown	4	5.4	2	4.8	4.8	12.5	7.7	.0

Table D-38

Time in Which an Instructional Unit Is Completed by Typical Class Size for All Reading Programs

Time Unit Completed	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
Different for Each Student	5	8	9	5	13	15	1	3	0	59
Same for a Subgroup of Students	0	3	0	1	2	2	0	1	0	9
Same for All Students in the Class	0	1	0	0	0	0	0	0	1	2
Unknown	0	1	1	0	0	0	0	0	2	4
Sum	5	13	10	6	15	17	1	4	3	74

Table D-39

Time In Which an Instructional Unit Is Completed by Typical Class Size for All Mathematics Programs

Time Unit Completed	Typical Class Size									
	1-3	4-8	9-15	16-20	21-25	26-30	31-35	Over 35	Unknown	Sum
Different for Each Student	1	0	1	4	14	9	1	2	1	33
Same for a Subgroup of Students	0	2	0	0	1	3	0	1	0	7
Same for All Students in the Class	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	1	0	0	1	2
Sum	1	2	1	4	15	13	1	3	2	42

Table D-40

Materials or Equipment Used

Materials, Equipment	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Only Standard Classroom Texts	0	.0	1	2.4	.0	.0	.0	.0
Paper Products (Textbooks, Workbooks, Manuals, Tests)	72	97.3	39	92.9	100.0	87.5	100.0	100.0
Audiovisual	60	81.1	27	64.3	76.2	62.5	76.9	60.0
Kits (Including Charts, Games, Models)	50	67.6	28	66.7	61.9	62.5	76.9	40.0
Computer	0	.0	1	2.4	.0	.0	.0	.0
Other	5	6.8	5	11.9	19.0	.0	30.8	.0
Unknown	3	4.1	1	2.4	.0	25.0	.0	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since a program can use more than one type of materials or equipment.

Table D-41

Instructional Area (Learning Space) Used

Instructional Area	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Typical Classroom	29	39.2	25	59.5	61.9	12.5	69.2	40.0
Center or Laboratory	30	40.5	9	21.4	9.5	62.5	15.4	40.0
Room Larger than Typical Classroom	7	9.5	6	14.3	9.5	12.5	7.7	20.0
Other	8	10.8	2	4.8	19.0	12.5	7.7	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Table D-42
Typical Class Size

Size of Class	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
1-3	5	6.8	1	2.4	9.5	.0	.0	.0
4-8	13	17.6	2	4.8	14.3	37.5	7.7	.0
9-15	10	13.5	1	2.4	4.8	12.5	7.7	.0
16-20	6	8.1	4	9.5	4.8	12.5	7.7	20.0
21-25	15	20.3	15	35.7	28.6	12.5	46.2	60.0
26-30	17	23.0	13	31.0	28.6	12.5	15.4	.0
31-35	1	1.4	1	2.4	.0	.0	.0	20.0
Over 35	4	5.4	3	7.1	4.8	.0	7.7	.0
Unknown	3	4.1	2	4.8	4.8	12.5	7.7	.0

Table D-43

Class Organization

Organization	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
Students Work Independently	5	6.8	1	2.4	.0	.0	.0	.0
Work Independently with Occasional Guidance as Needed	51	68.9	36	85.7	85.7	50.0	92.3	80.0
Student is Tutored	37	50.0	18	42.9	57.1	37.5	53.8	40.0
Pupil Teams	4	5.4	4	9.5	9.5	.0	15.4	.0
Small Groups (2-5)	54	73.0	31	73.8	76.2	62.5	76.9	60.0
Large Groups (Over 5)	25	33.8	19	45.2	33.3	25.0	38.5	20.0
Whole Class Works Together	15	20.3	6	14.3	19.0	37.5	23.1	20.0
Other	0	.0	0	.0	.0	.0	.0	.0
Unknown	0	.0	0	.0	.0	.0	.0	.0

Note. Percents do not sum to 100 nor frequencies to corresponding N since more than one organization may be used.

Table D-44

Number of Times That Each Instructional Organization Was Used in All Reading Programs by Typical Class Size

Organization	Typical Class Size: 1-3 (N=5) N	P	4-8 (N=13) N	P	9-15 (N=10) N	P	16-20 (N=6) N	P	21-25 (N=15) N	P	26-30 (N=19) N	P	31-35 (N=1) N	P	Over 35 (N=4) N	P	Unknown (N=3) N	P	Sum N	(N=74) P
Students Work Independently	1	.20	0	.00	0	.00	1	.17	0	.00	2	.12	0	.00	1	.25	0	.00	5	.07
Work Independently With Occasional Guidance	1	.20	6	.46	6	.60	4	.67	13	.87	15	.88	1	1.00	3	.75	2	.67	51	.69
Student is Tutored	5	1.00	9	.69	4	.40	2	.33	6	.40	8	.47	0	.00	2	.50	1	.33	37	.50
Pupil Teams	0	.00	0	.00	0	.00	0	.00	1	.07	1	.06	0	.00	1	.25	1	.33	4	.05
Small Groups (2-5)	0	.00	11	.85	9	.90	4	.67	10	.67	15	.88	0	.00	3	.75	2	.67	54	.73
Large Groups (Over 5)	0	.00	0	.00	2	.20	2	.33	11	.73	7	.41	0	.00	3	.75	0	.00	25	.34
Whole Class Works Together	0	.00	4	.31	3	.30	0	.00	3	.20	3	.18	0	.00	1	.25	1	.33	15	.20
Other	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00

Note. Proportions were computed based on the number of programs within a given class size category.

Table D-45

Number of Times That Each Instructional Organization Was Used in All Mathematics Programs by Typical Class Size

Organization	Typical Class Size: 1-3 (N=1) N	P	4-8 (N=2) N	P	9-15 (N=1) N	P	16-20 (N=4) N	P	21-25 (N=15) N	P	26-30 (N=13) N	P	31-35 (N=1) N	P	Over 35 (N=3) N	P	Unknown (N=2) N	P	Sum (N=42) N	P
Students Work Independently	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	1	.33	0	.00	1	.02
Work Independently With Occasional Guidance	0	.00	1	.50	1	1.00	4	1.00	13	.87	12	.92	1	1.00	2	.67	2	1.00	36	.86
Student is Tutored	0	.00	2	1.00	1	1.00	2	.50	4	.26	6	.46	0	.00	2	.67	1	.50	18	.43
Pupil Teams	0	.00	0	.00	0	.00	0	.00	1	.07	1	.08	0	.00	1	.33	1	.50	4	.10
Small Groups (2-5)	0	.00	2	1.00	1	1.00	4	1.00	9	.60	11	.85	0	.00	2	.67	2	1.00	31	.74
Large Groups (Over 5)	0	.00	0	.00	0	.00	1	.25	9	.60	7	.54	0	.00	1	.33	1	.50	19	.45
Whole Class Works Together	0	.00	0	.00	0	.00	0	.00	2	.13	1	.08	1	1.00	1	.33	1	.50	6	.14
Other	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00	0	.00

Note. Proportions were computed based on the programs within a given class size category.

Table D-46

Basis of Grouping Students Within Class

Basis	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Achievement Level	22	29.7	15	35.7	33.3	37.5	30.8	20.0
Student Interest	5	6.8	2	4.8	4.8	.0	7.7	.0
Instructional Unit Being Worked On	38	51.4	23	54.8	52.4	25.0	53.8	40.0
Not Applicable (No Grouping)	13	17.6	5	11.9	14.3	25.0	7.7	40.0
Other	6	8.1	4	9.5	14.3	.0	15.4	.0
Unknown	5	6.8	2	4.8	9.5	12.5	7.7	.0

Note. Percents do not necessarily add to 100 nor frequencies to corresponding N since more than one basis of grouping may be used.

Table D-47

Number of Personnel Required for Typical Class Size

Number of Personnel	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Typical Teachers								
None	11	14.9	2	4.8	4.8	25.0	7.7	.0
Less than Half-Time	2	2.7	0	.0	4.8	.0	.0	.0
1	53	71.6	34	81.0	85.7	62.5	84.6	80.0
2	3	4.1	1	2.4	.0	12.5	.0	20.0
3	2	2.7	2	4.8	.0	.0	.0	.0
4 or more	3	4.1	3	7.1	4.8	.0	7.7	.0
Specialists								
None	57	77.0	40	95.2	90.5	75.0	92.3	100.0
Less than Half-Time	8	10.8	0	.0	4.8	12.5	.0	.0
1	8	10.8	2	4.8	4.8	.0	7.7	.0
2 or more	1	1.4	0	.0	.0	12.5	.0	.0
Paraprofessionals								
None	22	29.7	14	33.3	23.8	62.5	7.7	40.0
Less than Half-Time	16	21.6	5	11.9	14.3	12.5	15.4	20.0
1	28	37.8	16	38.1	38.1	12.5	38.5	20.0
2 or more	8	10.8	7	16.7	23.8	12.5	38.5	20.0

(Table continued on next page)

Table D-47 (Continued)

Number of Personnel Required for Typical Class Size

Number of Personnel	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)	Reading Programs Grades K-3 Percent (N=21)	Reading Programs Grades 4-6 Percent (N=8)	Mathematics Programs Grades K-3 Percent (N=13)	Mathematics Programs Grades 4-6 Percent (N=5)
Volunteers								
None	59	79.7	33	78.6	76.2	87.5	69.2	100.0
Less than Half-Time	10	13.5	8	19.0	19.0	12.5	23.1	.0
1 or more	5	6.8	1	2.4	4.8	.0	7.7	.0
Student Tutors								
None	70	94.6	40	95.2	100.0	87.5	100.0	80.0
Less than Half-Time	3	4.1	1	2.4	.0	.0	.0	.0
1	0	.0	0	.0	.0	.0	.0	.0
2 or more	1	1.4	1	2.4	.0	12.5	.0	20.0
Other Personnel								
None	46	62.2	27	64.3	61.9	62.5	46.2	100.0
Less than Half-Time	26	35.1	12	28.6	38.1	37.5	53.8	.0
1 or more	2	2.7	3	7.1	.0	.0	.0	.0
Unknown	1	1.4	0	.0	.0	12.5	.0	.0

Note. Percents add to 100 and frequencies to corresponding N within each type of personnel.

Table D-48

Student:Adult Ratio

Student:Adult Ratio	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
1.0:1 to 1.4:1	3	4.1	1	2.4	4.8	.0	.0	.0
1.5:1 to 5.4:1	14	18.9	3	7.1	14.3	12.5	.0	.0
5.5:1 to 10.4:1	20	27.0	9	21.4	33.3	37.5	53.8	20.0
10.5:1 to 15.4:1	9	12.2	8	19.0	9.5	12.5	15.4	20.0
15.5:1 to 20.4:1	5	6.8	4	9.5	9.5	12.5	15.4	20.0
20.5:1 to 25.4:1	8	10.8	8	19.0	4.8	.0	7.7	20.0
25.5:1 to 30.4:1	12	16.2	7	16.7	19.0	12.5	.0	.0
30.5:1 to 35.4:1	0	.0	1	2.4	.0	.0	.0	20.0
Unknown	3	4.1	1	2.4	4.8	12.5	7.7	.0

Note. Student:Adult ratio is based upon the number of personnel required for typical class size, excluding student tutors and personnel working less than half-time.

Table D-49

Who Record Keeping Is Done By

Individual	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Student	12	16.2	8	19.0	14.3	25.0	23.1	20.0
Volunteer	6	8.1	2	4.8	.0	.0	.0	.0
Paraprofessional	19	25.7	11	26.2	23.8	37.5	23.1	60.0
Teacher or Specialist	52	70.3	31	73.8	66.7	87.5	61.5	80.0
Computer	5	6.8	3	7.1	9.5	12.5	7.7	.0
Other	4	5.4	3	7.1	9.5	12.5	15.4	.0
Unknown	4	5.4	1	2.4	4.8	12.5	7.7	.0

Note. Percents do not add to 100 nor frequencies to corresponding N since more than one person may keep records.

Table D-50

Frequency of Learner Evaluation and Assessment

Frequency	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Continuous or Daily	13	17.6	6	14.3	14.3	25.0	15.4	20.0
At End of Each Instructional Unit	45	60.8	27	64.3	47.6	50.0	30.8	80.0
Weekly	4	5.4	2	4.8	9.5	.0	15.4	.0
End of Semester	2	2.7	1	2.4	.0	.0	.0	.0
Other	10	13.5	9	21.4	19.0	12.5	38.5	.0
Unknown	7	9.5	3	7.1	14.3	12.5	15.4	.0

Note. Percents do not add to 100 nor frequencies to corresponding N since record keeping may be done at different times.

Table D-51

Source of Data on Learner Evaluation and Assessment

Source of Data	All Reading Programs		All Mathematics Programs		Reading Programs		Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)	Grades K-3 Percent (N=21)	Grades 4-6 Percent (N=8)	Grades K-3 Percent (N=13)	Grades 4-6 Percent (N=5)
Subjective Data	4	5.4	4	9.5	9.5	12.5	15.4	20.0
Objective Test Data	54	73.0	29	69.0	71.4	25.0	61.5	60.0
Other Objective Data	40	54.1	22	52.4	61.9	62.5	69.2	60.0
Other	1	1.4	0	.0	.0	.0	.0	.0
Unknown	3	4.1	1	2.4	4.8	12.5	7.7	.0

Note. Percents do not add to 100 nor frequencies to the corresponding N since more than one source of data may be used.

Table D-52

Tests Frequently Used in Program Evaluation

Test Name	No. of Times Used in Reading Programs	No. of Times Used in Mathematics Programs
Gates-McGinitie Reading Tests	24	0
Metropolitan Achievement Tests	15	11
California Achievement Tests	15	5
Stanford Achievement Tests	10	11
Wide Range Achievement Test	8	2
Comprehensive Tests of Basic Skills	7	2
Metropolitan Readiness Tests	5	3
Stanford Early School Achievement Tests	4	3
Iowa Tests of Basic Skills	3	4
SRA Achievement Series	1	5
Cooperative Primary Tests	3	1
Stanford Diagnostic Reading Test	3	0
Other Tests[a]	55	29

Note. A maximum of four tests could be recorded for any single program.

[a]Tests used at only one or two sites.

Table D-53

Origin of Tests Used in Program Evaluation

Origin	All Reading Programs		All Mathematics Programs	
	Freq.	Percent (N=153)	Freq.	Percent (N=76)
Program Developed	10	6.5	5	6.6
Publisher of Materials Used	3	2.0	0	.0
Other Test Publisher	137	89.5	69	90.8
Unknown	3	2.0	2	2.6

Note. Percents based upon the total number of tests recorded.

Table D-54

Type of Program Evaluation Evidence Reported for Cognitive Benefits

Type Evidence	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)
Pre- and Posttests				
Standardized Test				
With Control Group	19	25.7	17	40.5
Without Control	41	55.4	14	33.3
Program Test				
With Control Group	1	1.4	1	2.4
Without Control	0	.0	0	.0
Posttest Only				
Standardized Test				
With Control Group	5	6.8	1	2.4
Without Control	3	4.1	4	9.5
Program Test				
With Control Group	0	.0	0	.0
Without Control	0	.0	0	.0
Unspecified	4	5.4	2	4.8
No Evidence Reported	5	6.8	6	14.3
Not Applicable	0	.0	0	.0

Note. Percents do not add to 100 nor frequencies to corresponding N since more than one type of evidence may be reported.

Table D-55

Extent of Program Evaluation Evidence Reported for Cognitive Benefits

Extent of Evidence	All Reading Programs		All Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)
One Group of Students				
Over One School Year or Less	2	2.7	2	4.8
Over More than One School Year	7	9.5	4	9.5
Two or More Groups of Students				
Over One School Year or Less	50	67.6	22	52.4
Over More than One School Year	12	16.2	10	23.8
No Evidence Reported	5	6.8	6	14.3
Not Applicable	0	.0	0	.0

Note. Each grade level reported was considered a separate group of students. Percents do not add to 100 nor frequencies to corresponding N since more than one response category could have been marked.

Table D-56

Type of Program Evaluation Evidence Reported for Noncognitive Benefits

Type Evidence	All Reading Programs		All Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)
Pre- and Posttests				
Standardized Test				
With Control Group	4	5.4	4	9.5
Without Control	3	4.0	0	.0
Program Test				
With Control Group	2	2.7	1	2.4
Without Control	1	1.4	0	.0
Posttests Only				
Standardized Test				
With Control Group	2	2.7	0	.0
Without Control	0	.0	1	2.4
Program Test				
With Control Group	2	2.7	1	2.4
Without Control	1	1.4	1	2.4
Unspecified	1	1.4	1	2.4
No Evidence Reported	22	29.7	16	38.1
Not Applicable	36	48.6	17	40.5

Note. Percents do not necessarily add to 100 nor frequencies to corresponding N since more than one type of evidence may be reported.

Table D-57

Extent of Program Evaluation Evidence Reported for Noncognitive Benefits

Extent of Evidence	All Reading Programs Freq.	All Reading Programs Percent (N=74)	All Mathematics Programs Freq.	All Mathematics Programs Percent (N=42)
One Group of Students				
Over One School Year or Less	2	2.7	1	2.4
Over More than One School Year	1	1.4	1	2.4
Two or More Groups of Students				
Over One School Year or Less	10	13.5	6	14.3
Over More than One School Year	3	4.1	1	2.4
No Evidence Reported	22	29.7	16	38.1
Not Applicable	36	48.6	17	40.5

Note. Each grade level was considered a separate group of students. Percents do not necessarily add to 100 nor frequencies to corresponding N since more than one response category could have been marked.

Table D-58

Reported Use of Other Sources of Data
to Assess Program Effectiveness

Source	All Reading Programs		All Mathematics Programs	
	Freq.	Percent (N=74)	Freq.	Percent (N=42)
Student Questionnaire	11	14.9	8	19.0
Student Interview	4	5.4	4	9.5
Teacher Rating of Students	11	14.9	4	9.5
Teacher Questionnaire	19	25.7	12	28.6
Teacher Interviews	0	.0	1	2.4
Parent Questionnaires	18	24.3	7	16.7
Parent Interview	3	4.1	2	4.8
Classroom Observation	11	14.9	10	23.8
Other	14	18.9	9	21.4

Note. Percents do not sum to 100 nor frequencies to corresponding N since more than one source of data may have been used.